The Refrigeration Service Engineer

VOL. 9 NO. 6 ★ ★ ★ JUNE 1941

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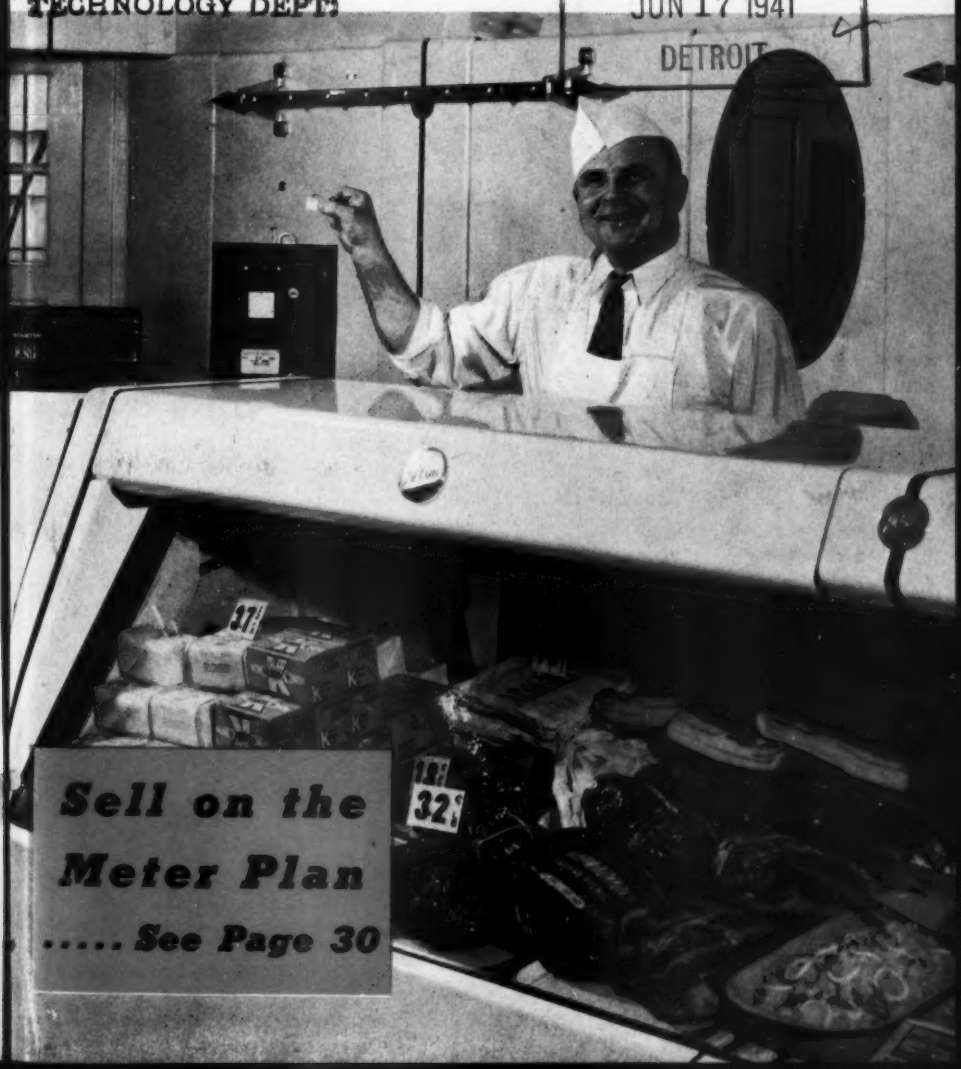

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June, 1941

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The Refrigeration Service Engineer

Vol. 9, No. 6 CHICAGO, JUNE, 1941 $2.00 Per Annum

"We're in This Thing Together"

PRIORITIES, selective service, defense production, unlimited emergency, are all common terms in the news today. Daily we are going to learn more of the meaning of these words and how they will affect our own business operation. Like most industries, we in refrigeration—manufacturers, jobbers, contractors and service engineers are confronted with unprecedented conditions which may suggest an entirely new line of thought and action. Business, as usual, is definitely out. It appears now that our future planning must be so flexible as to meet each new emergency as it rises. It may be that such changes may be a daily habit.

The best industrial minds are of the opinion that irrespective of the turn of events within the next few months, this country will place prime emphasis on military production and the forecast is that such production may be of a period of three or more years' intensification. Refrigeration, as a business, has not yet been able to secure a satisfactory rating as an essential industry, but it is hoped that those responsible for establishing preferential industries may come to recognize that the preservation, transportation and distribution of perishable food stuffs in which the use of refrigeration is a most essential factor will fully appreciate the importance of the industry in maintaining not only the health of the nation, but its contribution to the economic balance as well.

This has been termed a war of metals and metals are our basic tools. Let it be said that the sooner we, as individuals, accept for the purpose of our future plans that we face a long period of enormous defense production with its consequent material shortages, the sooner we can arrange our own house to meet and plan our future business course.

In our industry, three groups have problems of mutual interest and it is only through the coordination of the efforts of these groups and an understanding of each other's problems that we can work cooperatively for the best interests of all.

The manufacturer has not only the problem of securing necessary materials to keep goods flowing through the regular channels of distribution, but under the present circumstances, he is, no doubt, required to supply a greatly accelerated demand for defense orders, not the least of these which may be labeled "priority" in which Uncle Sam demands immediate preference regardless. Making this whole hearted effort for the defense program, the manufacturer is expanding every energy to supply as much as possible of the material that his customers require for their business existence.

The wholesaler or jobber, realizing that his very business is dependent upon his ability to secure the products for distribution to the service and installation field, is making every effort under present circumstances to secure materials for delivery to the service engineer. As the middle man, his is the difficult task, trying to maintain in this emergency some semblance of complete service without too much delay. The service engineer and contractor is depending upon his jobber for equipment to supply an increased demand made upon him. We should all realize that the manufacturer desires nothing more than to be in a position to supply equipment to the field that he has been so keenly interested in developing and the jobber recognizes that his existence is dependent upon his ability to provide immediate service. Yes, we are all in this thing together and the sooner that we recognize the problem, the easier the job of acclimating ourselves to these new conditions.

The service engineer and contractor will have added responsibilities. Labor shortages are occurring in our field and this undoubtedly will present an opportunity for qualified men to increase their service to the community. It will require the ingenuity of the refrigeration engineer to meet these conditions. Unquestionably much of the equipment that normally would be replaced will have to be kept in operating condition until such a time as new equipment can be secured. The best talents of the service engineer will have to be employed in meeting this situation, but it has been done before and we know it will be accomplished again to the credit of the entire field.

Profits will undoubtedly increase because the serviceman will be in a position to demand a fair return for the work to be done, but like any businessman, he should guard against taking undue advantage of an opportunity. The motive today should be to build for future business.

Let's recognize that the only way that we can make the best of these conditions is to appreciate the other fellow's desire to serve you and show consideration for the problems that he is confronted with. In doing so he will likely appreciate your cooperation and make every effort to reciprocate.

Application of Cold Plates as Replacements in Soda Fountains

This is the second article by the author on applications of cold plates. The first, appearing in the April issue, contained examples of application to trucks and locker plants.

By A. F. SAWYER *

THERE are many soda fountains in use which have developed troubles of operation so serious that the owner, after several expensive service calls, considers buying a new fountain. The trouble may be brine leaks, soft ice cream, water freeze-ups, water too warm, high power bills, and so forth. To correct these troubles, holdover plates can be installed at a small fraction of the cost of new equipment, give perfect operating results, and add many useful years to the life of the fountain.

The first procedure is to ascertain the number and size of cooling plates necessary for the ice cream compartment so they may be ordered ahead and be ready for immediate installation when the fountain is dismantled. A fountain with a capacity of eight five-gallon cans requires five plates. Most compartments are two ice cream cans wide and will take the standard 21-inch high by 21-inch wide plates. However, some compartments vary in height and width, so it is advisable to measure the depth from the bottom of the sleeve to the under side of the top, and if it measures 21 to 22 inches, the 21-inch height should be used. Then measure the sleeve from front to back, and if this is 20 inches to 21 inches, the 21-inch width is correct, since there is always a ½-inch space between the sleeve and the brine tank. If the sleeve is as narrow as 19 inches, plates 21 inches high by 19 inches wide should be used.

If it is necessary to reline the compartment, measurements may be taken by punching holes in the end sleeves, and inserting wire to obtain the measurements. The liner then may be made up in the form of an open tank of 22-gauge copper-bearing galvanized iron. Construct the tank with a ¾-inch turned-out flange at the top.

Some fountains with the so-called "step type" brine tank must have a new liner. These can be recognized by examining the inside of the sleeves and noting the special construction indicating the bottom of the surrounding brine tank at a point about two-thirds down.

When all material is at hand, plates, fittings, tubing, and so forth, remove the fountain top. This may be in one or two parts. Remove the screws around the collars and outside. It may be necessary to remove outside panels to expose these screws. Syphon or pump out the brine. The inner top of the brine tank may be screwed on or soldered; if soldered, cut with a chisel or melt with a blow torch, prying up the flange with a screw driver. After removing the sleeves, wash out the liner and inspect it for leaks. If the liner is copper and in reasonably good condition, leaks may be soldered after the metal is well cleaned. Paint with a good grade of aluminum paint.

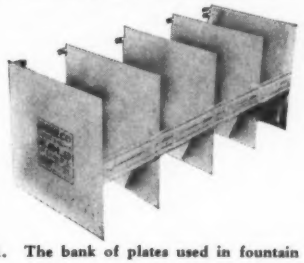


Fig. 1. The bank of plates used in fountain work.

Using the adjustable brackets furnished with the plates, set up the plates on the floor as they would be in the fountain, maintaining correct spacing between openings. End plates have the flange side against the wall, and intermediate plates should be correctly placed according to "in" and "out" markings. Saw off the pinched end of copper tubing on the plates and install solder ell connections. With the expansion valve

* Dole Refrigerating Co., Chicago, Ill.

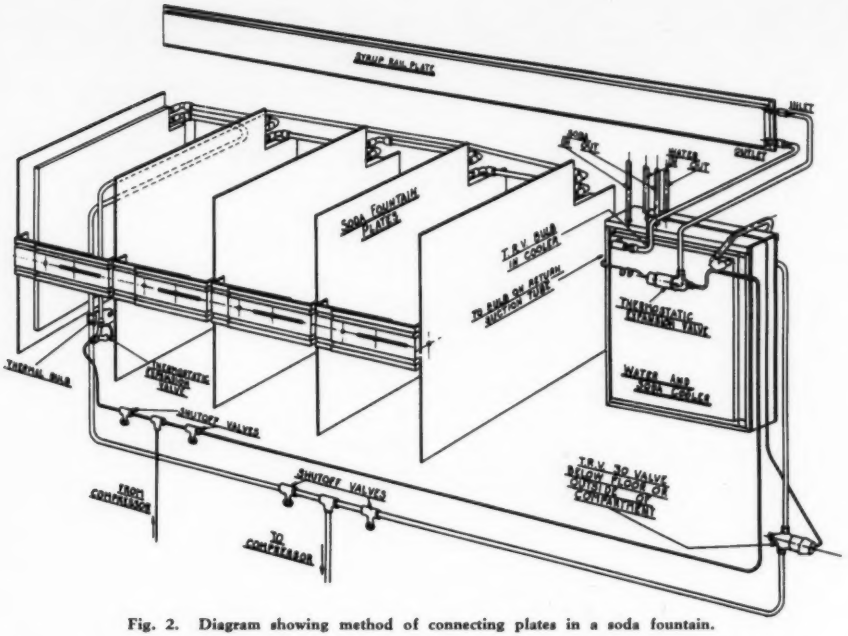


Fig. 2. Diagram showing method of connecting plates in a soda fountain.

located in the boiler opening, connect ½-inch tubing from the valve to one end of the plates, then make connections to the other plates as shown in Fig. 2. Measure the overall length carefully, solder the elbows, tighten the brackets, and place the unit in the fountain.

Since the temperature at the ingoing end is two to five degrees colder than at the outgoing end, it is recommended that the warmer end be nearer the draft arms for ease in dipping cream. Run ½-inch lines to and from the boiler opening. Use 10 pounds maximum back pressure thermostatic valve on the ice cream side. If a new liner is used, punch 5/8-inch holes at the boiler opening to take the tubing, and one extra hole for the capillary bulb. If the old liner is used, cut a piece of galvanized sheet iron to cover the old opening and attach it with metal screws.

The foregoing description applies to most fountains. Some fountains are constructed so that the cover of the ice cream section may be removed without disturbing the syrup bank. If the liner is in good condition, the plates may be assembled in the compartment and considerable labor saved by this method.

In mounting the thermostatic valve in the old boiler opening, be sure it is one inch away from the liner; otherwise it may become too cold to operate. The element should be clamped to the return line near the last plate. The capillary must be kept away from the ingoing refrigerant line. Pack Kapok into the boiler opening and seal well.

Remove the old boiler and old water coils from the bottle compartment. If the bottle compartment is not over 24 inches wide, a water-cooler of 10 gallons per hour capacity will provide sufficient cooling to hold the compartment at 42 to 48 degrees. If the compartment is 26 to 36 inches long, it is customary to add one soda fountain plate for the extra cooling load. This plate is in series with the water-cooler, the gas from the expansion valve entering the plate first. The water-cooler is usually placed at the back of the compartment. Use 3/8-inch I.P.S. x ½-inch flare ells on the refrigerant connections, and mount the expansion valve on the ingoing side in an accessible position. The Expansion valve bulb should be clipped on ½-inch tubing close to the cooler fitting. Use a 30-pound maximum back pressure thermostatic valve. If the plate or coil is

used behind the syrup jars, the refrigerant should enter this first before passing into the water-cooler.

A temperature-regulating valve is used to maintain the water-cooler at 38 to 40 degrees. This is usually placed in the return line of the cooler just outside the fountain or under the floor. It must be close enough to the cooler that the capillary line can be brought back with the bulb in the cooler. This layout allows maximum operating capacity of the cooler, since locating the valve in the cold bottle compartment may cause the valve to control from the bellows end of the capillary instead of from the bulb end.

Install a hand valve in the liquid line ahead of the water-cooler. Run copper tubing to the compressor, teeing into the ice cream refrigerant lines and make-up connections. A dehydrator and sight glass is recommended in the liquid lines. Blow out the system with gas and test for leaks. The back pressure control is usually used. Do not use a check valve on the ice cream return, as short cycling may occur when the temperature-regulating valve is on the throttling point. The temperature control of the ice cream compartment may be used if very close temperature range is desired. The element should be in air or clamped to the liner near the last plate.

After the refrigeration tubing work is complete and tested, replace the fountain top, using a mastic so that no air leaks can occur. Leaks cause excessive frosting of the plates, and odors from the bottle compartment will contaminate the ice cream. Fill the water-cooler with water through the hole in the cover. See that the temperature-control valve bulb is half-way down in the water-cooler.

Start the compressor, setting the back pressure control to cut in at about 12 pounds and cut out at about three pounds, if Freon gas is used.

Since a 30-pound thermostatic valve is used on the water-cooler and a 10-pound on the ice cream side, the water-cooler will receive refrigeration first and should cool to 45 degrees in 15 minutes. To adjust the valves for correct action, insert a thermometer in the cooler so that the bulb is six inches in the water bath. Set the temperature-regulating valve at number five position and operate the compressor until the thermometer reads 45 degrees, adjusting the thermostatic valve to hold the frost line near the bulb. At this point (45 degrees), the temperature-regulating valve should be showing a throttling action, and it may be necessary to open it slightly to bring the thermometer down to 40 degrees. Do not try to set it below 40 degrees during the first 12 hours of operation, as the system seldom becomes well balanced in less time. If frost appears on the temperature-control valve, close the thermostatic valve until the frost disappears.

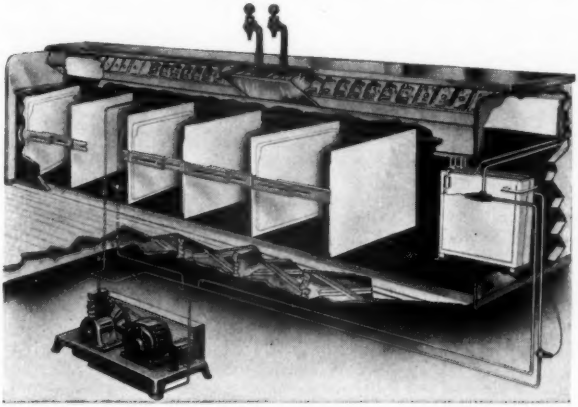


Fig. 3. A cutaway view of the fountain after the plates are installed.

Draw two glasses of water occasionally as a further check on the temperature. If it is 36 degrees or under, close the temperature-regulating valve two notches; if over 42 degrees, open it slightly.

Check the operating temperatures of the cooler and ice cream the following day. Do not attempt to adjust the water-cooler colder than 36 degrees in the bath.

The average soda fountain of forty gallons ice cream capacity will require a ½-h.p. condensing unit. Under 75-degrees temperature conditions, it will operate about one hour and idle two hours, giving a safety factor for hot weather conditions. For smaller fountains, a ⅓-h.p. will do.

(Model 3040)

Air-O-Matic Absorption Unit

(Continued from the May issue)

By GLENN F. ZELLHOEFER*

Heat Disposal Equipment

TO dissipate the heat liberated by the Air-O-Matic absorption unit, there may be employed:

A—Standard cooling tower of atmospheric or forced draft type.

B—Spray pond.

C—Direct use of city water or well water.

Atmospheric water towers for use with Air-O-Matic ordinarily are designed for a 10-18 F. approach to the wet bulb temperature with a 10-13 F. range, while forced air water towers ordinarily are designed for a 5 F. to 7 F. approach to the wet bulb temperature with a 15-20 F. range. With both atmospheric and forced air type of water towers, the optimum temperature for the water to leave the condenser is 100 to 105 F. In general, it may be stated that the size of the water tower, and the quantity of water circulated per unit of refrigeration capacity, is essentially the same for the Air-O-Matic absorption unit as is required for economical operation of refrigeration equipment of the compressor type, even though the quantity of heat dissipated is slightly more than twice as much. This is true because of the higher water temperatures that may be used economically with the Air-O-Matic equipment.

A spray pond as a means of dissipating the heat from the Air-O-Matic unit is not ordinarily applicable. However, in some cases combination rock garden and spray pond has been built and proven satisfactory, both from the standpoint of utility and ornamentation.

In some cases where tap water or well water is available at sufficiently low cost to warrant its use for this type of application, the Air-O-Matic is equipped with a water control valve for regulating the flow through the absorber and condenser, so as to afford an outlet temperature from the condenser of 103 F. to 105 F. If the water available never exceeds 70 F. during the cooling season, it is usually advisable first to use the water for precooling the air to be conditioned.

Air Distribution Unit

The complete air distribution unit consists of five sub-assemblies:

1. *Filter* for removing dust, pollen and other foreign particles from the air delivered to the air conditioned space.
2. *Blower Motor Assembly* to effect the circulation of air through the unit, ducts and air conditioned space.
3. *Steam Blast Coil* for heating the air in winter.
4. *Humidifier Nozzle* for the humidification of the air in winter.
5. *Cooling Coils* through which is circulated chilled water for cooling and dehumidifying the air in summer.

On installations in which the latent heat load is high compared to the sensible heat load, it may be desirable to use a reheat coil, and on many installations it is desirable to provide a fresh air cooling coil.

Control System for Complete Installation

The basic control system for Air-O-Matic consists of a selector switch, cooling thermostat, heating thermostat, humidistat, and necessary relays.

The selector switch has four positions: Off — Refrigeration — Ventilation — Heating. In the "Off" position of the selector switch, the circuit to all the equipment is open.

In the "Refrigeration" position, the cir-

* Air Conditioning Division, Williams Oil-O-Matic Heating Corp., Bloomington, Ill.

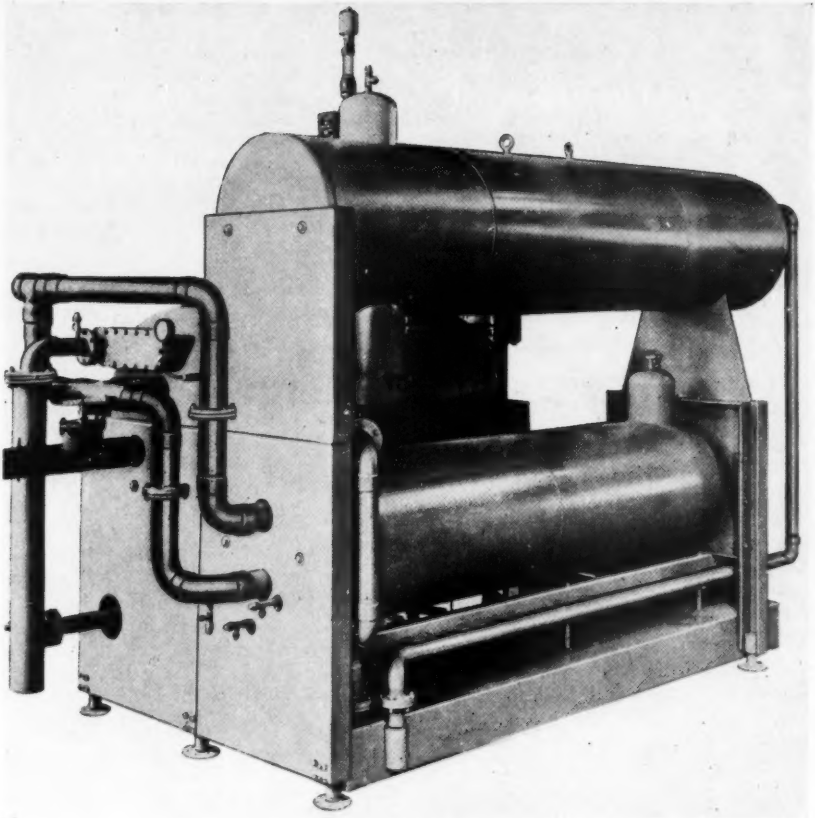


FIG. 2.

cuits to the motor of the air distribution unit, the motor of the absorption machine, and chilled water pump are closed. The blower of the air distribution unit operates continuously, and the cooling thermostat controls the intermittent operation of the absorption unit to maintain the desired room temperature. If the absorption unit is equipped with a forced draft cooling tower, the motors for the water pump and blower are operated in unison with the solution pump of the absorption machine, through the action of the cooling thermostat. If an atmospheric cooling tower is used, the water circulating pump is operated in conjunction with the solution pump of the absorption machine.

In the "Ventilation" position, the blower of the air distribution unit operates continuously to afford air circulation and ventilation.

In the "Heating" position, the circuit to the heating thermostat is closed, and the blower of the air distribution unit is started and stopped by this thermostat as required to maintain the desired room temperature.

The humidistat for control of humidity during winter operation closes a low voltage circuit when the humidity drops below a predetermined value, and this circuit opens a solenoid valve, permitting tap water under city main pressure to flow through the filter and solenoid valve to the humidifying nozzle. The circuit is so wired as to permit the humidifier to come into operation only when the blower of the air distribution unit is in operation.

As part of the absorption unit, there are

incorporated the following devices:

(1) High-pressure safety cut-out switch, to stop the machine should the refrigerant head pressure exceed seven pounds gauge.

(2) Low-pressure steam cut-out to prevent operation if the steam pressure in the heater is not maintained sufficiently high to insure satisfactory performance.

(3) Starting relay.

(4) Overload protection for the solution-pump motor.

(5) Necessary interconnecting wiring and conduit.

(6) Manual cut-off switch.

The water chiller is equipped with a low temperature safety cut-out switch, which opens the circuit to the solution pump motor if the refrigerant temperature in the chiller drops below 34 F., and closes this circuit when the temperature reaches 36 F.

The condenser is equipped with a fusible plug type of safety device, so that in case the ambient temperature exceeds 175 F., this plug melts and permits the discharge of refrigerant outdoors.

Data on special control systems may be obtained from the factory upon request.

(To be continued)

What Causes Dirt? Why Forced Air Units?

WHAT causes a collection of dirt on food stored overnight in reach-in refrigerators? Where does it come from? Why are manufacturers swinging more and more to forced-air units when this equipment aggravates the problem?

These are the questions recently received from a reader. Obviously such matters come within the realm of the lowside manufacturers; therefore, three engineers of three well-known firms were asked to submit their opinions. The original questions, together with the three replies are contained in the following:

The Refrigeration Service Engineer: I would appreciate some discussion of difficulties encountered where forced-air units are used in commercial reach-in refrigerators. We know that the faster the air circulation becomes, the greater becomes your dehydration problem. We are not so much interested in that, but more in the transferring of odors of food stuff within the box, as well as a noticeable dirt collection on food stuff kept in these refrigerators overnight.

The gravity-type coil may show evidence of transferring odors occasionally, but why are the manufacturers swinging more and more to the forced-air type and pushing that in preference to the gravity-type coil, when experience teaches us that forced-air units aggravate this problem, in some instances quite seriously?

Let us assume in the above, that there are absolutely no sewer gases entering the box and thereby eliminating that factor from the question. As to the dirt problem, let us assume that the restaurant operator is an exceptionally clean operator of a restaurant and does not permit his refrigerator to become dirty. This leaves us, then, with two major causes of dirt, one being a possibility that the ventilation system in the restaurants is circulating dirt, which, in turn, enters the refrigerator as the doors are opened frequently throughout the day. This cause, of course, can be eliminated by the introduction of filtering units into the ventilation system.

The remaining cause for dirt must be within the refrigerator itself, produced either by the "wearing down" of mechanical parts of the forced-air unit, or a possible chemical reaction produced by the various food stuffs within the refrigerator. I am very much interested in finding out if these are the real causes and what can be done about them, for surely, these two problems are real troubles to the restaurant operators. If these troubles can be eliminated or considerably reduced by slowing down the air motion within the box, why do not the manufacturers recognize this fact and install suitable forced-air units.

Has the refrigeration industry done any research work and issued papers on its findings dealing with the above? If so, would you kindly inform me of it?

The Answers

Editor: To begin with, the subject of forced air units in comparison to natural convection coils is certainly a very controversial one, as in both types of installations the restaurant operator has had plenty of grief and he has naturally passed this on to the installation and service man. Suffice to say that we believe that a correct and satisfactory installation can be made with either type of installation.

The letter written to you, states that the faster the air circulation becomes, the greater the dehydration problem. Dehydration is a function of humidity first and air motion second. If the proper coil is installed, i.e. one with sufficient surface, then a low temperature difference between the cabinet air and the refrigerant temperature is required and the air will leave the coil with a high humidity. As the ability of air to pick up moisture depends on its humidity, this air will then not dry the product out. The discoloration of meat products due to air motion is mostly caused by oxidation and, of course, the more air passing over the product the greater the oxidation.

The transfer of food odors to products such as butter, etc., indicates poor handling, rather than a problem of circulation. Regardless of the type of refrigeration, good circulation is necessary. If a product were put in warm and there was poor circulation, it would cool only by radiation which would certainly take a long time at such small temperature differences. Meat products would slime and mold under these conditions. With products giving off an odor, a separate compartment, a separate refrigerator, or fresh air is required.

Sources of Dirt

The sources of dirt are probably manifold but, except in cases where the operator overlubricates the fan motor, thus causing it to throw oil, the forced air unit certainly should not be guilty of this. The motor and fan are the only moving parts and if these had much wear they would not last very long. One very large source of dirt in walk-in refrigerators is the use of sawdust on the floor to catch the drippings. Another large source is the insulation in the refrigerator walls. Although the inside walls may appear to be sealed, yet when the door is opened quickly a powerful suction is created on the inside of the box, and you can appreciate the result of this on some of the older boxes using granulated cork or even sawdust for insulation. Dust and dirt may even be drawn from the outside by the continuous repetition of this door-opening process. Of course, dirt entering through the door is also an additive factor.

When freshly dressed meats are first placed in a refrigerator, there is a rapid flashing of the surface moisture due to the great temperature difference and this will carry with it particles of animal fats and oils. This in combination with dirt and dust usually makes the dirt very sticky. Usually coils will carry off much of this down the condensate drain, but at times the accumulation is too rapid and the coil blocks up.

CFM of Each Coil Similar

Editor: The average refrigeration man imagines that a gravity coil is a static proposition and that no air moves through it while the unit cooler being supplied with a fan moves large quantities of air for the same B.t.u. load. This is entirely erroneous and the refrigeration industry should correct itself on that point. The fact of the matter is that we have carefully investigated the air flow through gravity coils and were surprised to find that for a ton of refrigeration an enormous amount of air moves through a gravity coil. Based on these observations we have designed all our Unit Coolers to approximate the CFM per ton as closely as possible to the CFM per ton in a gravity coil.

It is true that at the discharge of a fan unit there may be higher velocities than with a gravity coil. It is also true that the induced current may add somewhat to the air flow in the refrigerating chamber. This last phase we are now studying with a specially designed low velocity electrical anemometer in the hope of determining what air flow actually takes place in various portions of various types of refrigerators. But the fact remains that careful investigation has indicated quite definitely that a properly designed and balanced system using a fan type evaporator will give overall results at least equal to a gravity type coil.

At this point please bear in mind that it is the same to me whether a customer buys a gravity coil or a fan type coil. We make them both. The reason that the fan type unit is rising in application is because it answers a great many problems which the gravity coil was unable to solve and is consistently enabling the fixture builder to solve his fabricating problems towards greater

economy in production, more accommodating fixture service and in general better lighting and more modern overall design.

The problem of odors has never been really solved. In view of the above, I do not believe that a Unit Cooler will induce odors any more than a gravity type evaporator. I have no laboratory observation to back up this statement with. Mere field observation has brought enough data to show that this statement is close to the truth.

Dirt accumulation around the operating sections of a unit cooler are not due, as your friend would indicate, to wearing down of operating parts. The dirt is simply material picked up in the air stream of free dirt within the refrigerator. Here too, there is no data which has been obtained by us under controlled conditions. My statement is based on field observation only. It would be interesting for me to hear of any laboratory work being done along this line.

Manufacturers Not Pushing Forced Air Units

Editor: In the third paragraph, he asks why the manufacturers are swinging more and more to the forced air type and pushing that in preference to the gravity type coils. The answer is that manufacturers are swinging to various new models of forced air units because of the demand on the part of service and installation people. They are not pushing these units—they are being pushed to build them. Whether or not the butcher and baker, etc. are demanding these units from the service people is not for me to say. If it appears the manufacturers are pushing these units more and more in preference to the gravity type coil, that is because it is in the hands of the advertising departments. They find that there is a good deal more to talk about in forced air type units than there is in a mere coil.

With reference to the question in the fourth paragraph, manufacturers are slowing down the air motion year by year in spite of the increase in competition. It is very easy to obtain greater capacity by merely increasing air speed, but manufacturers realize that there is no use "killing the hen which lays the golden egg," so they are not only slowing down the air speed but putting more surface into units. A few years ago it was customary to operate at from 25° to 30° T. D. between the refrigerant and box. This causes excessive dehydration. Now it has been reduced to from 10° to 15° T. D. and the dehydration has been reduced. A few years ago face velocity of units varied from 500 to 800 feet per minute; velocity nowadays runs from 250 to 500 feet per minute. Manufacturers in general build units of very many types and sizes so that the installation people have no excuse for not being able to select a unit which will give satisfaction.

With reference to the dirt and odors in the refrigerator, air-tight sealed doors by means of rubber gaskets have practically eliminated all outside dirt and dust. Any slime or dirt accumulating in the water of the drain pan of forced air units, comes from the food within the refrigerator. Foods which are likely to transfer undesirable odors rapidly should be covered up when placed in the refrigerator.

I am not trying to protect the forced air coil or show preference to this type over natural convection coils; I am merely trying to point out that this unit is not being forced down the throats of consumers by the manufacturers.

S S S

HANDY CONTAINERS

CONTAINERS made of 5/8-inch copper tubing in any length desired to fit the tool kit, are useful for the purpose of keeping lengths of solder or brazing rod clean. Solder carried loosely in the kit, accumulates dirt which makes soldering operations more difficult. The container can also be used for drills, assortments of cotter pins, small screws and other miscellaneous items found necessary to the service kit.

Jack Josephson, Bridgeport, Conn.

S S S

Vern A. Neal
Montana.

I am enclosing two dollars for a year of THE REFRIGERATION SERVICE ENGINEER beginning with the February issue, if possible.

I have missed your magazine immeasurably in the last few months. It is one of the best investments a refrigerator man can make.

Frank Gionanatti.

I wouldn't give up my subscription to THE REFRIGERATION SERVICE ENGINEER for anything.

Cleaning and Pickling Set-Up

By DONALD DELAYEN

TO properly reclaim or recondition parts and equipment in the repair shop, a complete cleaning and pickling set-up becomes an essential. For the shop doing a large amount of rebuilding work, this set-up should include a degreasing tank, a pickling tank for brass parts, a pickling tank for steel and iron parts, and a hot water washing tank.

The smaller shop requiring cleaning equipment for brass fittings and other miscellaneous small parts may require only two of the tanks mentioned.

In planning the arrangement, construction, and method of using these tanks, it must be borne in mind that codes in certain localities specify requirements which, for your own protection, should be closely followed. Acid tanks must be well ventilated, and any one using the acids should be warned to use extreme care in avoiding splashing of the acid. Rubber gloves, rubber aprons, and goggles should be worn while working over the tanks.

Construction

Unless the tanks can be installed out-of-doors, or in a separate room which can be well ventilated, the general arrangement should be as shown in Fig. 1.

Tank (1), which contains the degreasing solution, can be constructed of steel or galvanized iron and of sufficient size to submerge the largest parts to be cleaned. A suggested solution for the degreasing is made up by mixing four ounces of sodium metasilicate to one gallon of water, and adding to this mixture 1% by weight of powdered rosin. The solution should be heated to a temperature of 175 to 200 degrees, and the parts should be submerged in it from 15 to 45 minutes, depending on their condition. Wash thoroughly in cold water after removing from the solution.

Tank (2) can be constructed of galvanized iron and is provided as a protection against breakage of the nitric acid container, and to protect surrounding floors and objects against contact with the acid, this tank is filled with water. The acid container must be a crock, 20-gallon capacity or smaller, depending on requirements. A 20% nitric acid in water solution is contained in this crock for cleaning brass parts and fittings. Badly corroded steel parts may also be dipped for an instant in this solution. The

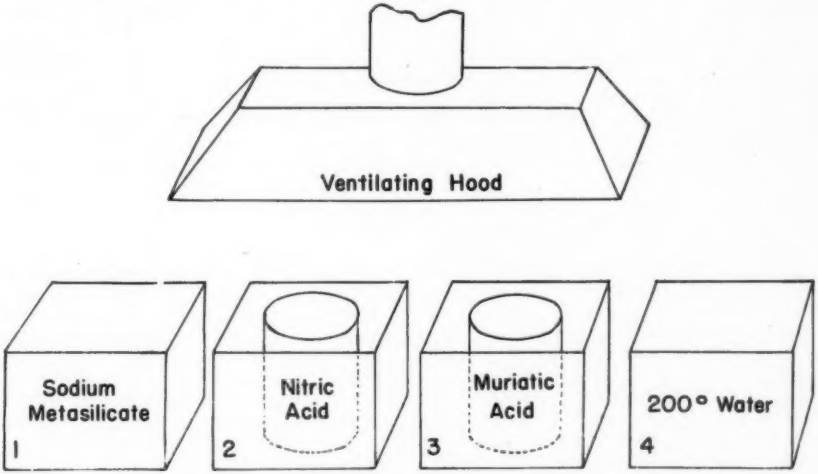


Fig. 1. Arrangement of tanks and ventilating hood for cleaning set-up.

action on steel, however, is very rapid and the parts must be in the solution for only a second.

Tank (3) is also a galvanized iron tank filled with water. The crock contains a solution comprising 20% by weight muriatic acid and 80% water. To this, one-half of one per cent by volume of Rodine No. 40 is added. Rodine can be purchased from American Paint Co., Ambler, Pa. This solution is for cleaning all steel and iron parts, including receivers and compressor bodies. Brass or copper should not be placed in this solution because they will turn black, and because iron and steel parts placed in it will become copper coated.

Tank (4) is the same as tank (1) and contains hot water held at about 200 degrees F.

Close fitting wooden covers should be provided for each crock to prevent vapors from rising from the acids while they are not being used and when the ventilating fan is shut off.

Cleaning Procedure

The procedure is the same for all parts which can be submerged in the tank, with the exception that brass or copper must go to the nitric acid bath, and steel or iron parts to the muriatic acid, except where they are badly corroded, when they may be dipped in the nitric acid bath.

All parts must be degreased first, because acid will not readily cut grease. Following the degreasing, they must be thoroughly rinsed in cold water, then in hot water. The heat imparted to the parts in the hot water speeds up the action of the acids. Next, dip the part in the muriatic acid or nitric acid, as the kind of metal requires. Submersion in the nitric acid must be momentary because of the speed of action of this solution. The muriatic acid will require more time, as experience and frequent inspection will indicate.

After the acid bath, the parts are washed thoroughly in cold water to insure the removal of all traces of acid. Any acid remaining on the parts may cause their failure at some future time. If you desire a neutralizer for the acid, a 2% soda ash solution held at 125 degrees can be used.

Following the washing or neutralizing, submerge the parts in hot water. Heat gained from the hot water will aid in the rapid drying of the parts. Use compressed air to blow them dry, then coat all steel or iron parts with oil or a rust inhibitor to prevent rusting.

Cleaning Coils

The cleaning of evaporator coils, condensers, and so forth requires some means of forcing solutions through them, such as that pictured on the front cover. It consists of two bottles either one gallon or five gallon capacity, depending on the size of the coils to be cleaned, and connected as shown. The pressure required to force the liquids through the coil can be supplied by a tire pump, as illustrated, by an air compressor or by a drum of refrigerant.

The interior of coils requires degreasing before the cleaning process, in the same manner as an exterior surface. The sodium metasilicate solution may be used for this purpose. Flush with water after degreasing, then circulate a solution composed of one-half pound of sodium bichromate and six ounces (liquid measure) of sulphuric acid to the gallon of water. This solution should be circulated back and forth through the coil until it is clean, after which it should be thoroughly flushed and washed with hot water.

56 TONS OF CONDITIONED AIR A MINUTE

TO speed production of military aircraft for defense, 56 tons of conditioned air a minute will flow through the new $11,000,000 "blackout" plant of Douglas Aircraft Company, Inc., now nearing completion on a 200-acre plot, at Long Beach, California. The plant, consisting of 11 windowless buildings, will be supplied by 35 complete Westinghouse air conditioning systems, according to Frank Jordan, Pacific Coast District air conditioning supervisor for Westinghouse. Total combined capacity of these zone systems is 1,400,000 cubic feet of air per minute. The average adult inhales less than one-third of a cubic foot per minute.

Men working three shifts are rushing installation of approximately 70 air conditioning systems as fast as the buildings are ready for them, L. N. Davis, plant engineer for Douglas, reported. To save floor space for vital defense manufacturing tasks, the equipment is being installed in the roof trusses, some are mounted 40 feet above the floor in several of the larger buildings.

The defense precautions extend even to air conditioning, a vitally important function in buildings lacking windows and other usual means of ventilation. Each air conditioning system is being separated as far as possible

and practicable from its neighbors. Hence even a luckily placed bomb could interrupt the function of only an isolated unit or two, plant attaches said. Conceivably a bomb dropped in a large centrally located air conditioning plant serving such a "blackout" factory might cripple the entire operation.

Cooling Effect Equals 2,400 Tons of Ice

A total of 56 tons of air per minute will be conditioned by the 35 systems comprising the Westinghouse part of the air conditioning installation. Total cooling job done by the same systems will equal the refrigerating effect of 2,400 tons of ice every 24 hours—equivalent to melting a huge block of ice 12 feet square at the base and 25 feet higher than the 555 foot Washington monument.

Each air conditioning installation will include hermetically sealed electrically driven refrigerating compressors, evaporative condensers and cooling coils, as well as cleanable air filters, fans, heating coils and temperature control devices. Cooled air will be delivered during the warmer months, and warm air during cool weather. Steam for heating coils will be supplied from separate plants in each building.

Comprising the largest single order for such equipment in Westinghouse history, the systems are being supplied and installed through Western Air and Refrigeration, Inc., Los Angeles distributor for Westinghouse air conditioning equipment.

Sweating Interiors

By KENNETH SHEA

ALONG about this time of year and during the hot summer months of each year, a number of questions are received by the Question Box inquiring about the cause of moisture gathering on the inside walls and doors of household refrigerators and other small cabinets. The complaints often refer particularly to the water dripping off the door of the evaporator.

The cause of this sweating seems to be unexplainable by the service engineer, and the customer becomes dissatisfied; therefore, this seems to be the time for a review of the cause which, it is hoped, will provide a simple explanation for the customer.

An explanation is all that is needed, because there is nothing mechanically wrong with the refrigerator and, therefore, nothing that can be done to prevent the sweating. It is caused entirely by the opening and closing of the refrigerator door and permitting a rush of warm humid air from the outside to strike the cold interior surfaces of the refrigerator.

You have often noticed how the cold water pipes in the basement, or how a glass of cold water, will gather moisture during hot weather to such an extent that the water will run off the outside surface. This is caused by the warm air striking a cold surface where the moisture condenses out of the air.

Exactly the same condition exists in the refrigerator. The inside surfaces of a refrigerator are at a temperature 40 degrees to 50 degrees lower than the air outside the refrigerator; therefore, when the door is opened and a rush of warm air enters the refrigerator, it is natural that the moisture of this warm air will condense out on the cold interior surfaces.

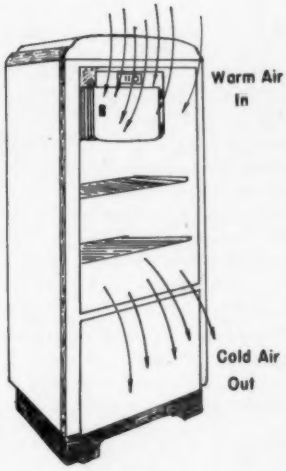


FIG. 1.

(Continued on page 41)

COMMERCIAL

INCREASE BUSINESS BY DOING A MORE EFFECTIVE JOB OF SELLING *Selling*

Keep a Policeman on the Job

SELL ON THE METER PLAN

*By F. G. Berchtold**

PUT a delinquent meter on the equipment you have just serviced, if the bill involved is too large to make a cash payment in full feasible. In twenty minutes with a length of flexible conduit you can connect the meter ahead of the compressor in the power supply. Therein is an insured payment because of the fact that the meter shuts off the electric supply if the proper daily payment is not deposited as scheduled.

Think a moment, if you please. Federal Government statistics reveal a glaring percentage of business failures in the natural course of things—especially of small businesses—and they are the source of our revenue in the sale and service of commercial refrigerating equipment to and for butcher, grocer, baker, florist, or tavern owner. It goes without saying that it is a gamble to place in the hands of a small businessman modern equipment, or even to bill substantial service charges for rebuilding jobs and replacement. These are highly competitive days; moreover, the country is striving to pull out of a depression. The retailer may be ever so enterprising, yet with only a small down payment in sight, the future, with all the uncertainties of present-day business, is not a happy one certainly. Without an instrument on the job to protect the seller's interests, many a sale or service job would be an impossibility and sheer folly.

The advent of the electric coin meter in its application to such commercial apparatus as direct-draw beer equipment, beverage coolers, reach-in boxes, and display cases puts a different complexion on the picture. The seller or servicing agency has a policeman on the job to see that the coins are placed into the meter daily, to shut off the equipment if its appetite is not satisfied, and to guarantee that monthly payment.

The typical delinquent meter is relatively simple with an electric clock as its main distinction. The clock is coordinated with a set of gears, with the gearing rated in accordance with the number of quarters (the quarter is the unit of payment) required daily in deposit. The gears only need be replaced to change the meter rating from customer to customer.

* Refrigeration Equipment Inc., Chicago, Ill.

These delinquent meters (DM6 Meter-Matic) can be obtained from the International Register Co., 15 So. Throop St., Chicago, Ill. (Price $10.95.)

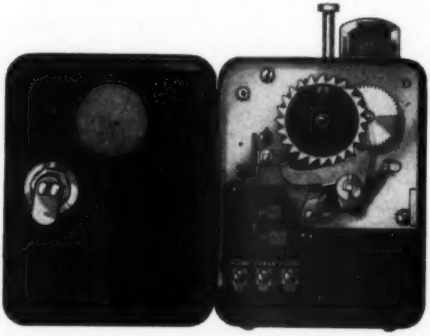
The customer's use of the meter is simple. If the meter gears call for four quarters a day, he places a quarter into the slot, taps a push rod at the top of the meter, and in so doing pushes a dial one notch to the number one black position from zero. His second quarter, deposited immediately thereafter, pushes the dial one more notch to number two, and so on The meter then runs in reverse through the four black numbers from four back to one.

Incidentally, the customer may deposit twenty-three quarters at one time and thus prepay for twenty-three periods of use. The clock will turn the dial backwards through the twenty-three dial numbers to zero. If he wishes to deposit more than twenty-three quarters at one time, the deposit of the additional quarters will not damage the meter, nor will these additional quarters give added operating periods. The DM6 meter in the single door case holds forty dollars. A larger case can be provided which will accommodate three hundred dollars.

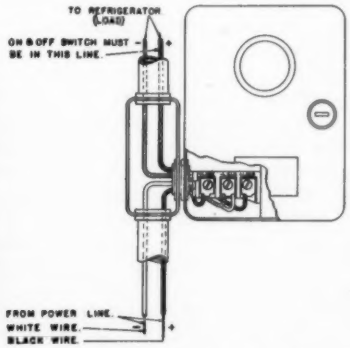
The meter has a delinquent payment feature which makes it necessary for the customer to make up any payments which may be skipped, either intentionally or inadvertently. Thus when the customer fails to make his proper deposit, the meter dial will push over into a red position. To secure current, he must deposit sufficient quarters to bring the dial out of the red and into the black. In short, he must bring his account up-to-date.

EXTERIOR VIEW OF COIN METER.

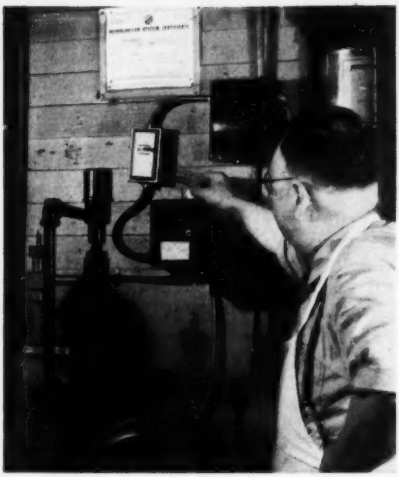
From our point of view, the gamble in contracting for future payment has been eliminated with this exception: If the small businessman, the grocer for instance, folds up and goes out of business, then the seller is faced with the problem of repossession, or the loss of contemplated payment for the service job; but as long as the storekeeper remains in business, even if in a faltering enterprise, with the only object to see the thing through, he will use the refrigerating equipment—and to use the equipment, the meter must be satisfied. The silent policeman is on the job.



INTERIOR VIEW OF COIN METER, SHOWING DIAL REGISTERING 4 CREDIT PAYMENTS, SWITCH MECHANISM AND COIN COMPARTMENT.



METHOD OF CONNECTING 1 H. P. MII AND DM6 METERS EQUIPPED WITH CONDULET NIPPLE TO CONDUIT.



COIN METER INSTALLED IN REAR OF CHICAGO MEAT MARKET.

With the gamble eliminated, the commercial refrigerator sales and servicing organization has a widened horizon. The down payment is no longer a stumbling block. In new sales, the finance company appreciates the value of the delinquent meter. To be sure, the size of the down payment remains a sales solidifier, but with an insured monthly payment, it is no longer all important. More sales, additional equipment, and sizable service jobs are the result; and more small retailers are enabled to use modern and economical equipment. "You need deposit in your meter only a quarter a day," or "you need deposit only seventy-five cents a day" is the sales clincher today.

Have you heard the grocer or butcher speak of his purchase of his refrigerating equipment or the rebuild job through the meter plan? "A fellow doesn't miss that fifty cents a day. I couldn't pay that $30 per, but it's there in that meter when you open it." "I was short this month, but your money is in the meter."

The meter plan of small daily payments is equally effective in helping the serviceman sell reconditioned household refrigerators. Many low income families are accustomed to pay cash for all their daily necessities. As a result they do not have lump sums available at the end of the month. The meter plan, on the other hand, calls for only a few coins a day—loose change that the customer never misses. For household refrigerators, a nondelinquent meter (M12 Meter-Matic Meter) with cord set connections is available. (Price $5.45 net, f.o.b. Chicago.)

We Americans, all of us, are poor budgeters. But the meter forces budgeting, and the small business man realizes it. In fact, several occasions have arisen wherein the purchaser insisted, after completing payment, that the meter remain. In a jesting manner it was suggested in one instance that the user purchase one for himself and pay the collector a monthly stipend of one dollar for emptying it. The tavern owner seized upon the idea with alacrity and was disappointed when told there was no actual provision for such a service.

Our arrangement in the disposition of commercial paper to finance companies entails the responsibility of collection. It is our function and desire to empty the coin box and forward the payments to the finance organization. Any enterprising business man can see the benefit arising from such contact regularly with his customers. The collector's company, through its representative, builds an acquaintanceship of inestimable value.

The utilization of the delinquent meter, with its feature of shut-off in case of nondeposit, has added needed life blood to the business. It has proved a boon to a hazardous undertaking. The silent policeman has taken the gamble out of the business. We can report nothing but success in its utilization, and the small business man for his own particular reasons, reaches the same conclusion; he has found a way to make his payments.

METER LEASE AGREEMENT.

This agreement, made between the undersigned buyer, hereinafter called the Buyer, and (firm name here), hereinafter called the Seller, refers to the (type of appliance here), described as (trade name here) No....., purchased from the Seller by the Buyer on lease purchase contract, hereinafter referred to as the Contract, but does not alter any of the agreements or understandings in the Contract, which remains in full force and effect. It is provided that the Seller will furnish a Meter-Matic, in which the Buyer agrees to deposit .....c per day as payment on the purchase of the (type of appliance here), the said .....c per day to be

accepted in lieu of the monthly payments stated in the aforesaid contract.

The Meter-Matic herein furnished is and shall always remain the property of the Seller and may be removed at any time at his option if it should be damaged or misused and/or if the Buyer fails to comply with all the terms and conditions of the Contract.

The Meter-Matic is furnished for the Buyer's convenience in making payments for the (type of appliance here). Should it be found necessary to remove the Meter-Matic for any cause whatsoever, the Buyer agrees to make payments thereafter in accordance with the terms set forth in the Contract and that this supplementary agreement shall thereupon be considered cancelled.

It is further agreed that the Seller's representatives shall have access at any and all reasonable times to the Meter-Matic coin box to collect the money therein deposited, for which a receipt will be given to the Buyer as evidence of the payment of said amount upon the Buyer's Contract. Until such receipt is given by the Seller or his representative, it is understood and agreed that all sums deposited in the Meter-Matic are and are to be considered the property of the Buyer.

.....
Buyer

Accepted for Seller

.....

Dated .....

NOTE: The above is offered as a sample only. Legal advice regarding the exact wording of this agreement should be obtained to make sure that it will conform with the laws of the State in which you operate.

Making Profits on Service Calls out in the Wide Open Spaces

By Lucius S. Flint

THE problem of how to make service trips into distant territories produce maximum returns has been solved in an interesting way by the Commercial Refrigeration Co., service specialists at Albuquerque, N. M.

The only exclusive refrigeration service company in Albuquerque, this firm services a vast amount of equipment scattered through a territory reaching out several hundred miles in each direction. The company is on call 24 hours a day and must be able to answer immediately any service call throughout the huge territory served. Many of these distant emergency calls couldn't be made to pay without charging the customers a prohibitive price if they were handled on the ordinary basis.

But the Commercial Refrigeration Company overcomes this difficultv through the solicitation of extra work in those towns while handling the emergency calls. In its files the company keeps a record of all commercial equipment in use according to localities. Then, when an emergency service call is received in any distant community, the service man inspects other nearby equipment and suggests minor repairs of the preventative type while he's there.

As a result of this method of operation, the company is able not only to build extra profits but also to handle emergency service economically for the individual customer. Because of this policy, the firm has created a tremendous amount of goodwill throughout the territory, is relied on regularly by hundreds of commercial refrigeration users.

The company's equipment records also give complete information on the type of equipment in use, its age and so on so that the service man going out on an emergency call knows in advance just about what he needs to take along. Without such a system it would be virtually impossible for the firm to cover the large territory now served as it would be entirely impractical to drive back several hundred miles for a needed part. The service trucks carry a basic stock of all small fittings, gaskets and so on, but space makes it impossible to haul the larger parts in any quantity.

The greatest problem is presented by condensers which frequently have to be replaced by cleanable types. The water throughout this area contains heavy mineral deposits and old-type condensers frequently become clogged.

The Albuquerque firm's plan of making inspections of all equipment in distant communities while handling emergency service call has led to obtaining a number of very valuable flat rate service contracts among large chain organizations operating

stores throughout the state. For instance, the company has a standing order for inspection of all equipment of a large grocery chain whenever they happen to have a man in the territory where one of the company's stores is located. Refrigeration users have found that frequent inspections, with preventative maintenance work as needed, save money in the long run.

The Albuquerque firm was started as a 100 per cent service establishment, and today still does some 75 per cent of its business in this line. However, several years ago, the company took on distribution for York and is doing an excellent selling job on merchandise. Three salesmen and three regular mechanics are used, the number of repairmen being sometimes as much as doubled during the peak season.

Experience here has shown that a sound service operation is the most helpful basis available for development of a heavy equipment business. This firm does practically all of its equipment business among established service customers who have been pleased with the honest treatment received. O. B. Stowe is owner of the Albuquerque establishment.

Apartment House Service Contracts Prove Profitable for this Concern

By Herbert Hanley

"IT TAKES specialization of the highest type for the refrigeration service firm to keep its head above competition." Those are the words with which Harry D. Schneider, owner of the Ace Refrigeration Service Company, sums up the merchandising principles of his business. Ace Refrigeration Service Company is one of the largest such organizations in St. Louis, and the oldest, having been founded 18 years ago.

Since 1922, Mr. Schneider has specialized exclusively in refrigeration service for realty companies—which includes every operation from the maintenance of multiple refrigeration systems in apartment houses, to large-scale repairs on commercial air conditioning equipment. When he entered the field, domestic refrigeration was comparatively new, and Schneider immediately chose the apartment-house service field as the one capable of producing the greatest amount of business. That he was right has been demonstrated by the fact that the Ace books have shown a business increase each year of the entire eighteen.

Now employing eight service men, the Ace Company specializes in stoker service, maintenance service, and a special bracket of refrigerator service for the owners of large apartment houses—many of which run over 60 boxes. It handles all city high school refrigeration in school cafeterias, and a great deal of the city's hospitals and other institutional work. Servicemen handle from ten to fifteen calls a day—indicating the continual pressure which this specialization has brought about.

Formerly, when apartment houses were built with multiple refrigerator service, Schneider made each deal on a contract basis—guaranteeing perfect operation of the system on a flat rate. Now, however, when apartments mostly have individual boxes, service work is charged off individually to each box. Because of his long reputation in the field, Schneider gets first call, and has a list of more than 550 apartment house owners as regular customers. "When we first went into business," Schneider explains, "refrigeration service was so new that we had to make most of our own parts. We owned a shop which could turn out compressor heads, valves, and all essential parts almost by hand—so difficult was it to obtain them from manufacturers. Thus, we were the

only service firm in many instances which could supply parts when a breakdown occurred, and we have built a good part of our business on that past service."

The old dies, stamps, lathes, and other tools which Schneider used for this purpose are still in the shop. Now, however, Ace maintains a $7,000 inventory of parts for all types of domestic refrigerators, and commercial refrigeration. The name "Ace" was chosen for a preferred listing in the telephone book Each year, Schneider orders 2,000 reprints of the telephone page on which his directory ad appears, pastes this up on a cardboard square, and mails it around to all potential customers —pointing out that any refrigerator need can be answered by dialing that number. Direct mail is used every three months to the entire customer list of apartment house owners, pointing out the desirability of a frequent checkup, and asking again for all service work. Schneider last year purchased over 400 used refrigerators, which were taken out of apartment houses in favor of new equipment. These, he reconditioned in his own shop and sold from the floor of a hardware store operated in connection with the service. More are sold for junk, or to other refrigeration service firms. Because he supplies so much apartment-house service, most such boxes taken in are 6 foot sizes, which he finds readily saleable at a profit of around $5 each. Twenty-four hour service is offered all apartment house owners, a feature much appreciated.

Clever Collection Letter

By Robert Latimer

OFTTIMES in the fatiguing business of collecting overdue bills, the businessman will find better results in using humor as leverage than threats of drastic action, or other such tactics, according to a St. Louis refrigeration service firm specializing in sales to smaller buildings.

Like other firms, this company has found a varying percentage of its accounts receivable delinquent from month to month, at times to the point that something more than a cut-and-dried statement is required to bring about the necessary reaction. In such instances, the company credit office, instead of issuing a warning notice, or threatening collection-agency action, has resorted to a clever collection letter idea which invariably gets results.

This is a "poem" written by the credit manager, and sent to the delinquent account in a personal-correspondence envelope, on handsome personal notepaper. Written in ink, and with nothing business-like about its appearance, the collection letter always gets to the person addressed ahead of other mail.

Entitled "A Poem You Oughta Read," the letter reads as follows:

Dear Mr. Blank
How Do You Do?
Some Pay Bills When Due
Some Pay When Overdue
Some Never Due
How Do You Due?

"Our credit department is awaiting your check."

Signed.....

Thus short and to the point, without wasted wordage of any kind, the letter is always read through before the recipient realizes that it is a bid for his attention to his overdue account. Because the letter is always written in longhand (usually by a secretary or office employe with a good hand) there is also little possibility that it will find its way to the wastebasket before the message is thoroughly registered.

Natural reaction of the reader is to smile at the "poem" and to reach for his checkbook, the refrigeration service firm has found. Instead of irritating the overdue-account, goodwill and appreciation of the cleverness of the letter results.

Of 200 such letters sent at a quarterly "cleanup" period on overdue accounts, replies totaled 56 checks, and more than 100 promises of quick action. The sponsoring firm has found that humor used in this way shows results at least three times more numerous.

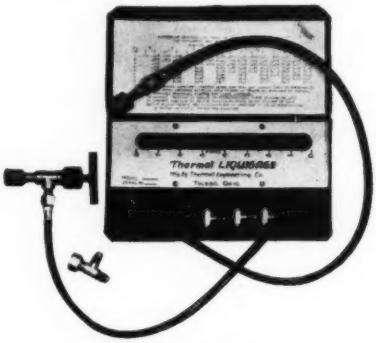
Visual Test Sells the Customer

*By Clarence W. Kamm**

WELL do we recall about 15 years ago, that the auto mechanic's chief piece of testing equipment was his screwdriver. By using it to short out the spark plugs in succession he diagnosed the trouble in our motors to the best of his knowledge and ability. That this was not sufficiently accurate is easily demonstrated by the array of testing apparatus that has been developed and which the modern mechanic has at his disposal. The radio serviceman of 15 years ago had a voltmeter and a pair of pliers. Today's average radio serviceman carries equipment that would do credit to a small laboratory.

The refrigeration serviceman of the same period in the past had a high and a low side gauge and his kit of wrenches. Today's average refrigeration service engineer has a high and a low side gauge and a kit of wrenches and very few other testing methods than his predecessor of 15 years ago. Yet the development of refrigeration equipment has kept pace with the improvement in automobiles and radios. We have only to read the trouble-shooting charts published by some of the refrigeration equipment manufacturers to realize that before refrigeration service can be really positive, better testing methods and equipment must be developed that will be accurate, reliable and fast. At the recent show in Chicago one of the first improvements in testing outfits was a professional looking refrigerator analyzer which was shown by one of the large manufacturers. Another recent test unit is the Thermal Liquigage to test the level of liquid refrigerant in the liquid receiver, one of the most important tests to be made by the service engineer.

Testing apparatus, to be worthy of use, should perform three distinct functions. First, it should give a positive indication of the ability of the part of the system being tested to perform its appointed task. The amount of liquid in the liquid receiver determines whether or not the whole system will function properly, therefore a liquid level indicator, such as the Thermal Liquigage, must give a well defined indication of the level of liquid. Previous methods of determining whether



THE LIQUIGAGE COMPLETE WITH HOSE, VALVE AND TEES.

there is sufficient refrigerant did not determine whether there was one drop above the outlet tube or a liquid receiver practically full unless all the liquid in the receiver is pumped into an empty cylinder and weighed, a procedure both troublesome and requiring much more time than can be spent on the average call. If the cost of all the call backs were figured for

* Thermal Engineering Co., Toledo, Ohio.

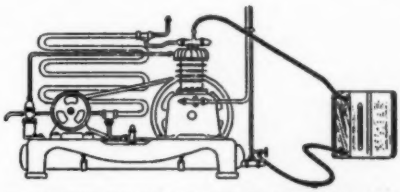
adding refrigerant because of a warm liquid line it would look like a national defense appropriation and one which must be paid out of the individual service engineer's or his employer's pocket.

An Aid to Service Sales

Secondly, testing equipment should promote the customers' confidence in the serviceman and the serviceman's confidence in himself. After all, it is the confidence of the customer in the serviceman that causes him to continue to call the same person or company when he needs service. It is nothing more than good business to do all in our power to create and build up such confidence. If, when he asks what we found wrong, we can show him, on a professional looking testing instrument, that he needs refrigerant in the system and then show him the level after it is added he will be much more inclined to pay the bill than if haphazard methods are used. The large oil companies, long ago, realized the need of getting the confidence of their customers. Visible reading gasoline pumps and the ruling that although the customer can see exactly how many cans of oil are being put in his crankcase, the oil gauge stick must be shown to him, are familiar to all of us.

Lastly, testing equipment should make money for the serviceman either by saving him time and call backs, enabling him to sell more merchandise, or by saving material which he would normally have to furnish without further compensation. Probably half the service calls made require charging or pumping of refrigerant. If a positive method of testing the amount in the liquid receiver, such as the Liquigage is used, the time necessary to test and the elimination of call backs because of wrong diagnosis constituted great savings. Many times the liquid level, while sufficient to operate the system, is too low for sufficient reserve. By showing the customer, he can easily be sold on the idea of adding enough refrigerant for a proper reserve. On new installations where the service engineer or contractor installs equipment on a contract basis he must furnish the additional refrigerant necessary. A saving of a few pounds on each installation would pay for the Liquigage in a short time and the installer would know definitely that the charge was correct. A check over a month or so after installation would show whether any leaks existed which had not been detected and could save a great deal if the installation included service for the year as many do.

There is a need for many other items of testing equipment for refrigeration service. There is little doubt that they will be produced in the not too far distant future. An instrument to show the volumetric efficiency of a compressor would be a godsend to the service engineer who is trying



THE LIQUIGAGE CONNECTED TO THE UNIT, FOR FURTHER DETAILS OF THE OPERATION SEE PAGE 35, APRIL 1941 ISSUE OF THE REFRIGERATION SERVICE ENGINEER.

to sell his customer on a complete rebuilding job or a new compressor. A compact tester for thermostatic expansion valves would save a great many expensive headaches and a control setting device for temperature controls would save hours of time and be much more accurate than present practice. The refrigerant service cylinder could be vastly improved so that it could be easier to use. Most servicemen take pride in good equipment and we predict the Liquigage is but the first of the many improvements in refrigeration testing procedure.

Sgt. James S. Ish
Iowa.

This is the most valuable magazine I receive.

Ed Kertzman,
Minnesota.

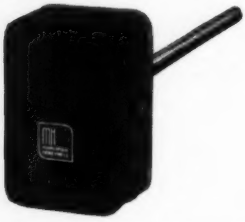
I think that THE REFRIGERATION SERVICE ENGINEER is "TOPS."

New and Improved Appliances

Information contained in this department is furnished by the manufacturer of the article described and is not to be construed as the opinion of the Editor.

Pneumatic Insertion Thermostats

TWO new additions to the line of pneumatic controls have just been announced by the Minneapolis-Honeywell Regulator Company—the new Master and Submaster insertion thermostats.



The Submaster thermostat may be used to operate valves or dampers to control the temperature of air or liquids while the Master thermostat, measuring the temperature of some other medium such as outdoor air, automatically resets the control point of the Submaster thermostat as the outdoor temperature changes. In a hot water heating system, for example, the Submaster control, located in the hot water supply, may be set to raise the water temperature from 100° F. to 180° as the outdoor temperature measured by the Master controller, drops from 60° to 0° F.

The sensitive rod and tube type of element permits accurate control over a wide range of temperatures. Both controllers have a scale range of —20° to 120° F. The Submaster controller may be adjusted to increase the control point 25° to 150°. The Master controller may be adjusted to produce the desired change in control point as the temperature of the outdoor air (or other medium) increases or decreases over a span of from 15° to 75° F.

Economical use of compressed air is assured because of the "non-bleed" type of construction. No air is allowed to bleed from the system except while the damper or valve is changing position.

All adjustments are located inside the case to discourage unauthorized tampering, but are readily accessible and easy to make when the cover is removed.

Descriptive literature on these new controllers may be obtained from the Minneapolis-Honeywell Regulator Co., 2950 Fourth Ave. South, Minneapolis, Minn.

Leak Detector Gains in Sales

VISOLEAK, the trade name for the product manufactured by the Western Thermal Equipment Company, Los Angeles, to immediately detect leaks in the system, has shown a substantial increase in use among refrigeration engineers since its first announcement recently in the REFRIGERATION SERVICE ENGINEER. Placed in the system, it locates the leak immediately by appearing as a red colored drop of oil. The base of the material is fine refrigerant oil and the manufacturer claims that it can be used in any type of system without harmful results. It has proven particularly valuable in Freon systems due to the difficulty of locating minute leaks with ordinary methods.

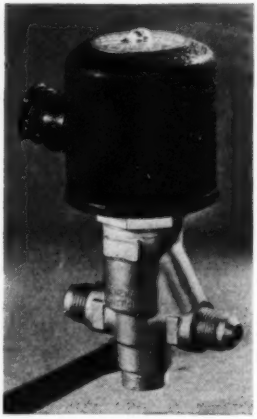
Being an oil base, Visoleak readily mixes with the oil and refrigerant in the system and it is recommended, if convenient, that the solution be introduced in the liquid line or high side. It can be conveniently added to the oil in the compressor, but the distribution throughout the system will require a longer time. If an oil separator is used it is, of course, essential that it be placed in the system beyond the separator.

The recommended treatment for a system is four fluid ounces, plus an additional ounce for each 10 pounds of refrigerant in the system, thus a system with a 40 pound charge of refrigerant would require eight ounces of Visoleak. In systems where an extremely large dryer is located, it may be necessary to add one-half the amount required for the original treatment after 24 hours operation in order to replace the color absorbed by the dryer. The manufacturer states that there is no harmful or deleterious effect on the drying agent.

General Controls New Valve

A NEW valve, listed as Series K-20-5, designed for the control of refrigerants such as sulphur dioxide, Freon and methyl chloride, is announced by General Controls Co., Glendale, California.

Special features claimed for this valve are its low power consumption, quiet two-wire solenoid, free from A.C. hum, simplicity of design and packless construction.



The bodies are forged; coils are moisture-resistant. A non-corrosive, hardened, wear-resistant needle insures

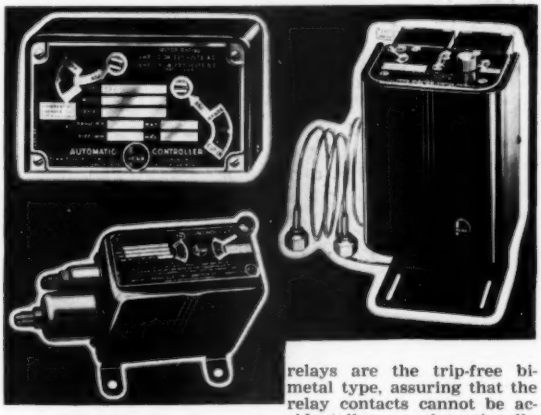
positive control. Maximum operative fluid temperature is 240° F. The tube head is brazed and will not leak even with a burned-out coil.

These valves are particularly recommended for small applications, and are highly efficient for fractional tonnage installations where continued tight shut-off is necessary. Also capable of handling larger capacities up to 2.5 tons Freon. They also operate on air, water, gas and light oil. Made in one port size only — 5/32 inch, for standard ⅜ inch I.P.S.

Series K-20-5 valves are available with sweat or flare soldered connections in any desired combination. All main valves are held open electrically, eliminating compressor burden. Further information and engineering data will be furnished on request to General Controls Co., 801 Allen Avenue, Glendale, California.

New Penn Calibrated Control

PENN ELECTRIC SWITCH CO., Goshen, Indiana, has recently announced to the refrigeration industry its three lines of controls incorporating accurately calibrated visible scales in a range of electrical capacities and prices to



fit all refrigeration and comfort cooling applications.

According to their announcement, the following basic types are available: 1265 series for pressure and temperature applications on installations to and including ½-hp.; 1260 series for pressure and temperature applications on equipment to and including 1-hp.; 1261 series for dual pressure and dual temperature applications (incorporating high pressure cutout) for applications to and including 1-hp., and 1713 series for dual pressure applications on single and polyphase equipment to 2-hp. maximum.

The 1713 series is available with one or two overload relays for motor overload protection. These overload relays are the trip-free bimetal type, assuring that the relay contacts cannot be accidentally or intentionally locked in closed position. The bimetal type overload mechanism provides positive and unvarying operation, regardless of the number of trip-outs.

Controls in this same range of electrical capacities and the same range of prices are available without calibrated scales for those installations which should be made with control equipment that discourages alteration of the settings by customer or user, according to the Penn announcement.

Stator Windings for Hermetics

IN servicing hermetically sealed units frequently the stator must be rewound. The Berdor Electric Co., Chicago, has specialized in rewinding stators and a complete replacement stock for G. E.'s, Grunows, Majestics and other refrigerators are always available for immediate replacement.

The Berdor Electric Co. has recently moved to larger quarters at 3454 N. Cicero Ave., Chicago, in order to enlarge their manufacturing facilities and to provide an improved service to their increasing list of customers in the refrigeration field.

Whiz Electric Tool

THE Whiz electric tool, according to its manufacturers, Paramount Products Co., 48 West 48th St., New York, N. Y., is an all-purpose, rugged, power tool, weighing less than three and one-half pounds and capable of handling heavy power jobs, as well as delicate precision work.

The standard model Whiz utilizes no less than fifty different accessories, many of which do several different jobs. The frame is die-cast, of light weight, giving ease of handling and long life. The three-jaw, coil spring chuck has ¼-inch capacity, and it is triple-geared for extra power. There is ample power for the most difficult drilling operation. The ball-bearing thrust insures smoothness of operation. The two-speed model combines normal speed and high speed in one outfit, and uses 200 different accessories, all of which are instantly interchangeable.

Among the operations that can be performed with this tool are: drilling up to ¼ inch, grinding, wire-brushing, sanding, polishing, sawing, shaping, etching, engraving, and carving. It is suitable for use on any material, including steel, glass, jewels, plastics, wood, etc.

The tool has so many uses around the shop and home, you will be interested in reading a full description of it in the illustrated folder obtainable from the manufacturer on request.

REMA Plans Activities at 6th Convention

E. A. VALLEE, Milwaukee
President

W. C. ALLEN, Defiance, Ohio
Vice President

R. H. LUSCOMBE, Goshen, Ind.
Treasurer

MEETING at French Lick, Indiana, for its Sixth Annual Convention, May 7th to 9th, the Refrigeration Equipment Manufacturers Association transacted its annual business and conducted a priority drawing of exhibit spaces for the All Industry Refrigeration and Air Conditioning Exhibition to be held in Chicago in 1942. The annual election of officers resulted in the re-election of E. A. Vallee, Automatic Products Company, President; W. C. Allen, Modern Equipment Corporation, Vice-president; R. H. Luscombe, Penn Electric Switch Company, Treasurer; and R. M. McClure, Executive Secretary. The office of Secretary-Treasurer was divided and John Wyllie, Jr., Temprite Products Corporation, was elected to the position of Secretary. J. A. Strachan, Sales Manager of Kerotest Manufacturing Company, Pittsburgh, R. H. Luscombe and John Wyllie, Jr., were the new directors elected. Wednesday's sessions were devoted principally to committee activities. The Trade Relations Committees of National Refrigeration Supply Jobber's Association and the Refrigeration Service Engineers Society met with REMA committees to discuss mutual problems. C. E. Borden, President of the Jobber's Association and E. A. Plesskott, President of the Refrigeration Service Engineers Society headed their respective committees. The RSES Convention Survey Committee discussed the plans for their 1942 annual convention and the subject of concerns engaged in the refrigeration supply business distributing catalogs direct to consumers with trade discounts shown.

Thursday, May 8th

The formal business of REMA got under way with President Vallee's address outlining the progress REMA has made during the past year. He particularly emphasized the fine cooperation which the executives of member firms had given in support of the REMA organization and its activities. He briefly summarized the success of the last All Industry Exhibition and many of the

CHARLES BENSON, Chicago, Ill.
Chairman of the Exhibition Committee

R.S.E.S. Convention in Chicago

JANUARY 12-15, 1942

THE Board of Directors acting upon the report of the R.S.E.S. Convention Survey Committee meeting with the R.E.M.A. Relations Committee, have announced the 8th Annual Convention of the society will be held in Chicago, January 12-15, 1942, the dates of the All Industry Refrigeration and Air Conditioning Exhibition.

committee activities which have been started in the interest of expanding membership services during the coming years.

Following President Vallee's report, H. B. Trix, President of the American Injector Company, acting as program chairman, introduced W. A. Sredenschek, Assistant Manager, Trade Relations, General Electric Company, who outlined the method General Electric employs in providing a training course and source of supply for their future sales engineers and technicians.

Robert LeBaron, Virginia Smelting Company, discussed a subject of wide interest to the membership on methods of "Collection and Analysis of Data on Field Conditions," describing the mechanical facilities set up to secure and distribute this information to his sales organization.

W. C. Allen, Vice-president of Modern Equipment Company and Vice-president of REMA reported on the annual meeting of the United States Chamber of Commerce.

Evening

J. L. Hamilton, Century Electric Company, was the speaker at the banquet with an address on "Industry and National Defense." The entertainment committee, headed by Robert LeBaron, with the capable assistance of Ivan Corcoran, Square D Co., arranged for "a home talent performance" which provided the necessary fun. An unlooked-for pleasure was the international radio hookup arranged by the committee with messages for the REMA group from the axis partnership of Matzuoko, Hitler and Mussolini. The vocal accompaniment for the radio program was provided by William Keefe, Fedder's Sales Manager.

Friday, May 9th

Committee reports occupied the early morning session and following the disposition of the association business the exhibition chairman, Charles Benson, Imperial Brass Manufacturing Company conducted a drawing for priority for the Fourth All Industry Refrigeration and Air Conditioning Exhibition. Over twenty per cent more applications were filed for space at this time than at any previous drawing.

In view of the committee's plans for the further development of the mezzanine section of the show, it is certain that there will be two full floors of exhibits.

SWEATING INTERIORS

(Continued from page 29)

The fact that the evaporator door seems to be most affected is due to its location in the path of the warm air. This is illustrated in Fig. 1. When you open the door, the heavier cold air rushes out at the bottom toward the floor, which causes the warm air to be drawn in at the top. Since the evaporator is nearly always at the top center of the cabinet, it is the first cold surface the air comes in contact with.

The degree of interior sweating will depend entirely on the amount of use the box receives and the humidity of the air outside the box.

Sweating on the outside of the box is an entirely different story. If the outside surfaces of a refrigerator become cold enough to condense moisture on them, we can assume that the insulation is faulty and that considerable refrigeration is being lost. If sweating occurs around the outside edges of the door, it is very likely that the door gasket is leaking and needs replacing.

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I am interested. Please send my copy of the new Kerotest Catalog No. 10.

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The Question Box

Readers are invited to send their problems pertaining to the servicing of household refrigerators and small commercial refrigerating equipment to "The Question Box."

WATER COOLER IN BOTTLING PLANT

QUESTION 430. I was called to make a control adjustment of an installation made recently in a local bottling company's plant. The owner required a water temperature of 40 degrees or lower, and he was getting 55 or 60 degrees. The machine was short-cycling and cut in at about 34 pounds and out at 25 pounds. I added five pounds of F-12 and lowered the adjustment on the pressure control. The results were a little longer cycles, 50-degree water temperature, and a collection

Should this chamber frost up? Is there a screen or restriction on either side of this surge chamber?

The engineer in charge was advised to start his water-cooling equipment five minutes before he started his bottling machine. Should he not possibly allow a longer time to enable the machine to take care of the water already stored in the tank?

I do not know how many gallons per hour are used, but the equipment surely should do better than this. Only one bottling machine is being used. I am not familiar with the characteristics of a machine as large as this one, as my experience has been mostly with household and small commercial units. Any advice or suggestions will be appreciated and carefully followed.

I have been told that the set-up has never worked right since its installation four months ago, and the installer advised the engineer in charge to adjust the valves, which did not remedy the situation.

ANSWER: Getting an adjustment on this type of refrigerating unit will be difficult under the best of conditions, due to the fact that the load will not be very consistent. From the explanation you have given me, I am inclined to believe that the main trouble is improper adjustment of the controls, and as a start, I would suggest that you set the pressure control on a cut-in pressure of twenty-eight pounds and a cut-out pressure of seventeen pounds.

Then I would adjust the expansion valve until frost no longer appears on the surge

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chamber or on the return line leading to the chamber. At this setting, it is possible that the water temperature may be too cold, except when the machine is working at its full capacity, or in other words, when the greatest amount of water is being drawn through the cooler. If the temperature is too cold at all times, then from this starting point, you can readjust the pressure control gradually, raising it until the proper temperature is arrived at.

Of course, there may be other troubles which would be caused by the design of the unit; however, the information you have given me has not indicated anything of this nature.

FREEZING ICE CREAM

QUESTION 431: We have an Anheuser-Busch storage box 14 feet long, 8 feet wide, and 8 feet 6 inches high. It is built with one inch of wood outside, six inches of cork and one inch of wood inside. We wish to use this box to harden 500 gallons of ice cream in twelve hours' time, and the box will not be opened in this time.

As near as I can figure this, the heat leak on the box would be about 3663 B.t.u. per hour for this time in a 90-degree room with a box temperature of —15 degrees. I figured the hardening load at 504 B.t.u. per gallon of ice cream, or 21,000 B.t.u. per hour. They wish to pull the box and ice cream to —15 degrees in the twelve hours.

What do you think of two large blower coils for this work? What size coils and what kind would you recommend? Blower type, plates, or pipe coils? The box is now equipped with 1180 feet of one-inch iron pipe divided into two coils, but this will not begin to do the work. What size water-cooled compressor do you recommend?

ANSWER: Your calculations for the leakage through the cabinet check very closely with mine, and therefore, I would assume they are correct.

However, I am at a loss to account for your figure of 504 B.t.u. per gallon of ice cream hardening load. The figure that I would ordinarily use would be 320 B.t.u. per gallon. Of course, the discrepancy may be due to the ingredients used in the ice cream, to the overrun of the ice cream in freezing, or to several other factors which may affect it. The figure 320 B.t.u. is based on the weight of one gallon of ice cream being 5 pounds and having a specific heat of .45.

The temperature of the ice cream leaving the freezer would be 25 degrees; thus the temperature difference of the cream between freezing and hardening would be 40 degrees. However, in the calculations in the following, I am going to use your figure, and if you find for any reason that your figure is not correct, corrections may be made to the following:

The total load on the condensing unit, using your figures, will be 21,000 plus 3,662 B.t.u. equals 24,662 B.t.u. per hour. Although you state that the 500 gallons of ice cream are going to be cooled in a twelve-hour period, we can assume that, either at the present or at sometime in the future, another 500 gallons will be placed in the cabinet to be cooled in the next twelve hours, thus providing a continuous 24-hour load on the compressor.

It will be necessary, then, to supply a compressor and coil with sufficient capacity to run not more than sixteen hours per day, and at the same time, provide a 24-hour load of 24,662 B.t.u. per hour. The machine would then have to be 24,662 x 24 divided by 16 equals 36,996 B.t.u. per hour.

If you refer to any manufacturer's catalog, in which the capacity of their condensing units are shown, you may select a unit with a capacity of about 37,000 B.t.u. per hour at a suction temperature of about minus 25 degrees.

Your evaporator coil can be selected in the same manner, from the manufacturer's catalog. With regard to the type of coil to select, I don't believe that my opinion on this matter would be any better than yours. There are, however, two considerations in the matter. One is that you already have quite a number of feet of bare pipe coil in the cabinet, and to add the extra feet required would probably not cost as much as installing a complete new coil. On the other hand, blower type coils require a good deal less space, and because the height of the box is not very great, this space may be valuable. Also, in using the blower type coil, you may secure one which is equipped with electric defrosters, thus simplifying your defrosting problem.

HOW MANY FEET OF PIPE?

QUESTION 432: I am sending you a problem that has caused three of us fellows a lot of trouble. We have figured it out, but since we all get different answers, we would appreciate it very much if you would figure this out for us so we could see where we have made our mistakes.

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The Frigidaire Summer-Winter Cold Control is easily operated by the store owner or manager. It is adaptable to installations having gravity or forced air evaporators. A two-way control of fixture conditions is provided:

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Temperature Range: 34° to 42° F.

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Normal range: Off, +4°; On, +18° F. Coldest obtainable: Off, −14°; On +2° F. Warmest Obtainable: Off, +20°; On, +32°F. Minimum Differential Obtainable: 8½° to 8¾° F.

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TO SATISFY YOUR EVERY REFRIGERATION SERVICE NEED

Write or Phone Your Frigidaire Distributor for Complete Information

I am a subscriber of ICE AND REFRIGERATION and THE REFRIGERATION SERVICE ENGINEER.

How much 1¼-foot pipe would it take to maintain a temperature of 32 degrees in a storage cooler with the following specifications: 42 feet x 32 feet x 12 feet inside; ⅞-inch wood in and out; water-proof paper —4-inch cork insulation; outside temperature 90 degrees; inside temperature 32 degrees.

ANSWER: It is very likely that my calculations and yours will not agree because of the fact that we are each likely to work with somewhat different factors.

To begin with, I note that you state the inside dimensions of the box only, whereas in calculating the heat losses, the outside dimensions should be used. Therefore, I am working on the basis of the box being 33 feet x 43 feet x 13 feet high. Therefore, the surface area amounts to a total of 4,814 square feet.

Calculations

The temperature difference, according to your statements, is 58 degrees, and from heat leakage tables I have at hand, a wall constructed of ⅞-inch wood on the outside and inside, with waterproof paper between, and insulated with 4-inch cork, will be .06 B.t.u. per square foot per degree temperature difference per hour. The total heat leakage on this basis will be 4,814 x .06 x 58 = 16,752 B.t.u. per hour.

I would select a K factor of 2.5 B.t.u. per square foot of 1¼-inch pipe per degree temperature difference between refrigerant and air per hour. Since this coil is operating in what might be termed "still" air, we will assume that we will have a temperature difference of 15 degrees between the refrigerant and the air. The square feet of coil surface required then will be 16,752 divided by 2.5 x 15 which will equal 447 square feet. There are approximately 2.28 lineal feet of pipe to one square foot, and it will require 447 times 2.28 = 1,019 feet of pipe.

All this, however, is only a part of the story, inasmuch as your information does not take into consideration the product load, the load due to air changes, and the load due to light appliances operating in the box or men working in the box. All of these items will add a considerable additional load and should be figured in.

I would suggest that you purchase a copy of our book entitled, "Commercial Refrigeration and Comfort Cooling." This book will give you the method of calculating heat losses in almost every common application of refrigeration, and I'm sure you will find it very useful in any future work of this nature you may come in contact with.

REFRIGERATION IN A HATCHERY

QUESTION 433: Please send me your recommendation as to coil size and type, compressor size, and type of control for the following:

A room for the storage of hatching eggs. Room size outside, 12′ x 20′ x 9′. Walls, floor, and ceiling to be two layers of ⅞-inch wood. One layer of felt or building paper on 2 x 4 joists. The joists to be 20-inch centers and the walls to be filled with rock wool.

Three of the walls and the roof will be outside with sun on one wall in the morning and one wall in the evening. The roof will be galvanized iron directly on top with no air space between it and the insulated ceiling of the room to be cooled.

There will be one 3′ x 7′ insulated door that will be opened about twelve times a day. Product load will be about 1000 eggs a day to be stored for about two weeks. Outside temperature 90°. Inside temperature 65° to 70°. Cooling water for compressor 80°.

I think that this is a new application and the reason for it is to try and keep the percentage of hatchability of eggs the same the year around, as in the winter months it is much better than in the summer months.

The temperature of 65° to 70° inside is the owner's idea of the proper temperature. For this purpose, we would like for you to give us as complete information of this job as you can. Should we need to take in any fresh air other than our infiltration when the door is opened? What humidity should we try to maintain and how? Is 65° to 70° the proper temperature and how close a differential should we try to keep?

ANSWER: Assuming the conditions as shown in your letter, we tabulate the following heat gain for the storage cooler:

One end with sun effect
108 x .125 x 40 = 540
One side with sun effect
180 x .125 x 40 = 900
One end shaded
108 x .125 x 35 = 470
One side shaded
180 x .125 x 35 = 790
Roof with sun effect
240 x .125 x 75 = 2,250

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Floor with sun effect	
240 x .125 x 25 =	750
	5,700
Infiltration and light usage	
2,080 x .02 x 35 =	1,400
Total....	7,100
Add for 16 hours operation	3,550
Total load....	10,650 B.t.u. at 40° F.

The proposed temperature to maintain in the cooler should be about 55°. This information was obtained from the Dairy Supply Editor of the Prairie Farmer. They also stated that below 50° injured the germination of the eggs, and above 60° the germ of the egg began to develop. The relative humidity should be held around 85 to 90 percent. Drafts should be eliminated and for that reason ventilation will not be required.

The suggested equipment necessary to do this job would be as follows:

1—¾ h.p. Condensing Unit—425 r.p.m. set at 37 pounds suction pressure.
4—Fin Coils with drip pans.
4—Thermostatic Expansion Valves.

ERRATIC VALVE ACTION

Question 434: This is a dairy job of Frigidaire make, a large brine tank to cool a small walk-in cooler, the brine being used also to cool milk, both pasteurized and raw. The coil is a plain tube, of course, ⅝-inch copper, controlled by a thermo expansion valve, and it is the only coil on this unit. The unit is a 1-h.p. job, which should be large enough to run a much larger job.

Recently I moved this system from one dairy to a new location. Everything worked perfectly for several weeks, then things started to happen that aren't in the book. The brine tank defrosted, then the suction line frosted up and defrosted intermittently. At first I suspected moisture, so changed the Silica Gel dryer which I had put in on installation. This did no good. Next I put in a new valve, but with no better luck. I know I have enough gas as the head pressure is o.k., and the sight glass I put in behind the filter shows plenty of refrigerant. (SO_2) I noticed a boiling sound in the brine tank, so I figured it was oil trapped in the coil, but the engineer claims that with the tube no larger than it is, there should be plenty of gas velocity to return this oil to the compressor.

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with

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Hydraulic-Action Temperature Control. Range −20° to +50° Fahrenheit. Adjustable differential 3° to 25°.

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Controls for Heating • Refrigeration • Air-Conditioning

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One day I went up and found the compressor frosted over. Why should this happen with a new valve? The clamp is good and tight. Will you please let me know at once what your views are? I will appreciate it immensely.

I have consulted two engineers and both gave me the same answer, "A bad valve."

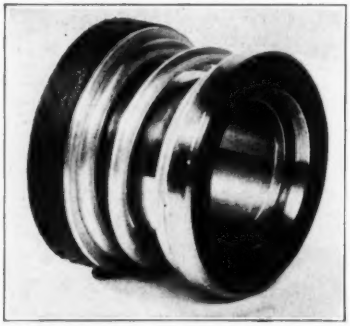
ANSWER: It is very possible that the expansion valve is defective as the engineer has stated. However, I am more inclined to believe the trouble is due to the location of the feeler bulb on the expansion valve. You did not mention this in your letter, but I notice from your diagram—and I hope that the diagram is correct in its detail—that the feeler bulb is located outside of the brine tank. In this location the temperature surrounding the feeler bulb will be higher than the temperature inside the brine tank. Therefore, the valve is being controlled by this higher temperature instead of by the temperature which the superheat of the valve was set to maintain.

Your pressure switch will be actuated by the pressure of the coil in the brine tank, while the thermostatic valve is being actuated by the pressure corresponding to the temperature on the outside of the brine tank. Because of this condition, the machine will probably cycle in its normal manner, but because of the warmer temperature outside the brine tank, the valve will open up, permitting liquid refrigerant to pass into the coil long before the pressure switch cuts the machine in.

This creates a flooded condition of the brine tank coil during the off-period, and as soon as the machine starts, liquid refrigerant will flood over to the suction line causing it to frost.

From there on during the operating period, the valve will be continuously hunting as a result of the intermittent slugs of liquid refrigerant which will pass into the suction line, affecting the feeler bulb on the expansion valve and causing it to close and open as this frost line recedes or extends on the suction line.

If you will install the feeler bulb of the expansion valve below the brine level in the brine tank you will overcome this condition. It is quite probable that after making this change, the expansion valve may have to be readjusted.



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Only **THAWZONE** *can get the "hard-to-get" water!*

What do you do when water gets "trapped" in a system and can't reach the drier which is anchored far away from the water? You do nothing because you don't know it! BUT—damage is going on, corrosion is taking place—until finally the unit stops and needs tearing down.

The only way to remove "trapped" water is with THAWZONE—the *liquid* dehydrant which constantly circulates thru the system—hunts down water *wherever* it is and chemically destroys it without harm to refrigerant, oil or parts.

But the *best* way is to keep the water out altogether, by using THAWZONE as a preventive. Only 1/8 ounce, costing 10c, for each pound of refrigerant, does the trick if used before the unit is installed and running.

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CONDENSER EXPLODES

QUESTION 435: I have a problem here on which I surely need some help. I have a ¼-h.p. Delco motor, Model S-3822, that uses a No. T201729 Aerovox condenser. My trouble, mainly, is that condenser. Three times in about six weeks it has exploded like a charge of gunpowder. I have checked this machine (a bottle cooler) over and can find nothing wrong. The load is very light this time of year, and otherwise the machine runs very nicely.

I have replaced a good many condensers but have had nothing like this happen before. I would appreciate a reply very much.

ANSWER: The information I obtained from the Aerovox people is that this trouble may be due to failure of the centrifugal switch in the motor or relay in the control system to disconnect or kick off within the rated three second starting time. Such conditions will cause the capacitor to break down. Because of excessive time voltage applied, electrolytic capacitors cannot withstand starting periods exceeding three seconds nor voltage exceeding 138 volts.

Increased starting time may also be due to failure of the centrifugal switch or relay to disconnect the capacitor from the line. This may be caused by mechanical failure of the switch, or by excessive load on the motor because of a sticky compressor or, perhaps, a dry motor bearing.

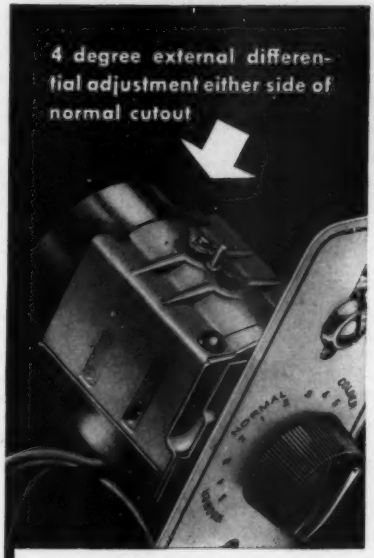
Another cause for capacitor failure is improper adjustment of the thermostat or refrigerator valves, causing too frequent starting of the motor. The electrolytic capacitors cannot be used for more than twenty start-stops per hour. A new capacitor should never be applied before you have checked, first, the centrifugal switch, second, easy turning of the motor and compressor, and third, the thermostat and valves.

The fact that the capacitors you have used actually explode would make it seem that the amount of heat generated within them must be excessive, and this, in turn, would indicate that the voltage is either too high or that the load on the motor is excessive.

WESTINGHOUSE HERMETIC

QUESTION 436: I have a domestic refrigerator containing a brine solution in the evaporator. It is a Westinghouse about 10 years old, and it isn't freezing right. Everything seems to be o.k., but as I am unfamiliar with brine evaporators, I think this is the seat of the trouble.

"THIS GRAND LITTLE IDEA SURE SAVES ME TROUBLE!"



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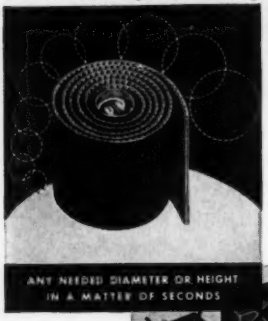

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My theory is that the coils and brine tank are coated with CaCL deposits, if the brine is composed of CaCl. Is it? I can't seem to find out what type of a brine Westinghouse used. If it is lime deposits causing the trouble, is there any way I could clean the coils by chemical solution? What is the usual procedure in this case?

ANSWER: I do not know what brine is contained in the Westinghouse refrigerator, because it is my understanding that several different solutions were used, depending on the model and time the unit was manufactured. I believe that in some an oil was used as a holdover solution, while in others a calcium chloride brine was used, and in still others, an alcohol brine was used.

It would be a simple matter, however, to find out which of these your refrigerator contains. Tasting the brine will determine whether it is calcium chloride. It should have a salty rather dry taste. Alcohol will be readily detected by its odor, and oil can be detected by a feeling of lubrication when rubbed between the fingers.

I hardly believe it is possible that calcium chloride deposits will cause your trouble, because as long as there is any moisture left in the evaporator in which the calcium can be dissolved, the calcium will very likely remain in a dissolved condition. However, if the water from the solution has evaporated to the extent that much of the calcium has precipitated out, it would be easily removed by washing out with water, which will again dissolve the calcium allowing its removal without any trouble.

You haven't given me any information, apart from the fact that the Westinghouse is not freezing right, from which to diagnose the trouble. Therefore, I can only confine my comments to the possibilities surrounding this calcium brine. It is very unlikely that your trouble would be due to the calcium deposits in the brine chamber. It is more likely that the trouble would be due to the solution's becoming so weak that it is permitted to freeze during the on-cycle of the refrigerator. Freezing of the solution sets up an insulating blanket around the evaporator and does not permit the proper temperature to reach the outer part of the shell.

Of course, there are other possibilities for the cause of this trouble, such as some mechanical defect within the system itself; oil in the evaporator is one of these, and it may be caused by either too much oil in the system or to the improper return of oil from the evaporator.

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Refrigeration Service Engineers' Society

Official Announcements of the activities of the National Society and Local Chapters appear in this department as well as articles pertaining to the educational work of the Society.

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To further the education and elevation of its members in the art and science of refrigeration engineering; for the reading and discussion of appropriate papers and lectures; the preparation and distribution among the membership of useful and practical information concerning the design, construction, operation and servicing of refrigerating machinery.

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CANADIAN CAPITAL CHAPTER, OTTAWA, ONT., CANADA: Meets 1st and 3rd Mondays. President, C. R. Jones, 7 Fairbairn Ave., Ottawa, Ont., Canada. Secretary, Edw. E. Hills, 54 Blackburn Ave., Ottawa, Ontario, Canada.

CENTRAL ARIZONA CHAPTER, PHOENIX, ARIZONA: President, R. S. Peel, R. 9, Box 80, Phoenix, Arizona. Secretary, LeRoy Davis, Route 12, Box 1233, Phoenix, Arizona.

CENTRAL INDIANA CHAPTER, MARION, INDIANA: Meets 1st and 3rd Tuesday. President, W. M. Sevy, 229 W. Market St., Wabash, Indiana. Secretary, Vern Noid, 909 Bond Ave., Marion, Indiana.

CENTRAL NEW YORK CHAPTER, SYRACUSE, NEW YORK: Meets 2nd and 4th Mondays. President, Fritz Harder, 123 Delmar Place, Syracuse, New York. Secretary, Henry Jenda, 211 Milton Avenue, Syracuse, New York.

CHICAGO CHAPTER, CHICAGO, ILLINOIS: Meets 2nd and 4th Tuesdays. President, Peter Bendl, 5471 Monitor Ave., Chicago, Ill. Secretary, Myer Axelrod, 5814 Chicago Ave., Chicago, Ill.

CHICKASAW CHAPTER, MEMPHIS, TENNESSEE: President, W. C. Easley, 2590 Yale St., Memphis, Tennessee. Secretary, Boyd Evans, 1062 Oakview, Memphis, Tennessee.

CLEVELAND CHAPTER, CLEVELAND, OHIO: Meets 2nd and 4th Thursdays. President, K. P. Wall, 1127 Carnegie Ave., Cleveland, Ohio. Secretary, W. E. Wright, 1483 E. 105th St., Cleveland, Ohio.

COLONELS CHAPTER, LOUISVILLE, KENTUCKY: Meets 1st and 3rd Thursdays. President, H. H. Shuell, 507 Second St., Louisville, Kentucky. Secretary, H. C. Moore, 4028 W. Broadway, Louisville, Kentucky.

COLUMBUS CHAPTER, COLUMBUS, OHIO: Meets 2nd and 4th Thursdays. President, H. L. Scott, 1452 N.W. Blvd., Columbus, Ohio. Secretary, Paul A. Oberly, 22 West Naghten Street, Columbus, Ohio.

DAYTON CHAPTER, DAYTON, OHIO: Meets 2nd and 4th Thursdays. President, G. G. Orsborn, New Paris, Ohio. Secretary, Loran E. Brumfield, 2414 Woodside Ave., Springfield, Ohio.

DES MOINES CHAPTER, DES MOINES, IOWA: Meets 2nd Wednesday. President, Eugene A. Laverrenz, 7200 W. Douglas Avenue, Des Moines, Iowa. Secretary, O. A. Luepke, 610 University Ave., Des Moines, Iowa.

FOX RIVER VALLEY CHAPTER, OSHKOSH AND FOND DU LAC, WISCONSIN: President, E. K. Wagner, 516 Jackson Drive, Oshkosh, Wisconsin. Secretary, V. O. Bilss, 111 Van Street, Neenah, Wisconsin.

FURNITURE CITY CHAPTER, GRAND RAPIDS, MICHIGAN: Meets last Thursday each month. President, Harry A. Scott, 2715 Meyer's, S.W., Grand Rapids, Michigan. Secretary, Lester J. Pool, 878 Grandville Ave., S.W., Grand Rapids, Michigan.

HUDSON MOHAWK CHAPTER, SCHENECTADY, NEW YORK: President, Edwin J. Walters, 101 Prospect St., Schenectady, New York. Secretary, William R. Andrews, 75—5th Ave., Troy, New York.

ILLINOIS VALLEY CHAPTER, PEORIA, ILLINOIS: Meets every other Friday. President, Glenn W. Dresback, 1112 S. Fell Ave., Normal, Illinois. Secretary, Roy L. Davidson, Dunlap, Illinois.

INDIANAPOLIS CHAPTER, INDIANAPOLIS, INDIANA: Meets 2nd and 4th Tuesdays. President, E. W. Wulf, 1457 N. Grant St., Indianapolis, Indiana. Secretary, John T. Bunton, 445 N. De Quincy St., Indianapolis, Indiana.

KANSAS CITY CHAPTER, KANSAS CITY, MISSOURI: Meets 2nd and 4th Tuesdays. President, Elmer Blousser, 520 W. 12th St., Kansas City, Missouri. Secretary, R. E. Meeker, 3600 Harrison Street, Kansas City, Missouri.

LINCOLN CHAPTER, LINCOLN, NEBRASKA: Meets 1st and 3rd Mondays. President, J. E. Cole, 119 N. 16th St., Lincoln, Nebraska. Secretary, A. Lee Cook, 4816 Randolph St., Lincoln, Nebraska.

(Continued on page 60)

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Chapter Directory—Continued from page 58

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LONE STAR CHAPTER NO. 2, FORT WORTH, TEXAS: President, A. M. Johnson, 805 Davis St., Fort Worth, Texas. Secretary, J. C. Gant, 2928 Hemphill, Ft. Worth, Texas.

LONG BEACH CHAPTER, LONG BEACH, CALIFORNIA: Meets 1st Thursday each month. President, E. F. Brown, 918 N. Muriel Ave., Compton, California. Secretary, H. R. Casler, 553 W. 107th St., Los Angeles, California.

LOS ANGELES CHAPTER, LOS ANGELES, CALIFORNIA: Meets 2nd Wednesday each month. President, W. E. Young, 4742 Oakwood Ave., Los Angeles, California. Secretary, F. W. Gillett, 3008 W. 84th St., Inglewood, California.

MADISON CHAPTER, MADISON, WISCONSIN: Meets 2nd Thursday each month. President, Harry Streich, Marshall, Wisconsin. Secretary, A. L. Robertson, 410 Walton Place, Madison, Wisconsin.

MICHIANA CHAPTER, SOUTH BEND, INDIANA: President, J. A. Pechl, 1514 S. Scott Street, South Bend, Indiana. Secretary, L. E. McKee, 1316 E. Dayton St., South Bend, Indiana.

MILE HIGH CHAPTER, DENVER, COLORADO: President, Ernest L. Martin, 69 S. Pearl St., Denver, Colorado. Secretary, A. C. Darby, 2140 Market St., Denver, Colorado.

MISSISSIPPI VALLEY CHAPTER, DAVENPORT, IOWA: Meets 1st and 3rd Tuesdays. President, E. J. Soens, 418 Fifth Avenue, Iowa City, Iowa. Secretary, E. J. Ford, 210 Elliott Street, Kewanee, Illinois.

MISSOURI VALLEY CHAPTER, OMAHA, NEBRASKA: Meets 3rd Thursday each month. President, Allen L. Mahan, 310 S. 24th St., Omaha, Nebraska. Secretary, Gordon Lozier, 2918 Dodge Street, Omaha, Nebraska.

MOHAWK VALLEY CHAPTER, UTICA, NEW YORK: President, Elmer Thomas, 1003 Miller St., Utica, New York. Secretary, Carl V. Pearson, 1416 Steuben Street, Utica, New York.

MONTGOMERY CHAPTER, MONTGOMERY, ALABAMA: Meets every Thursday. President, Milo B. Howard, 711 S. Lawrence St., Montgomery, Alabama. Secretary, J. M. Gantt, 24 Capitol Parkway, Montgomery, Alabama.

MONUMENTAL CHAPTER, BALTIMORE, MARYLAND: President, J. W. Matthels, 2656 W. Franklin Street, Baltimore, Maryland. Secretary, Herbert Frame, 607 Willow Ave., Baltimore, Maryland.

MOTOR CITY CHAPTER, FLINT, MICHIGAN: President, Wilbur Henderson, 3705 Beecher Rd., Flint, Michigan. Secretary, David Fortune, 802 E. Russel Ave., Flint, Michigan.

MOUNT ROYAL CHAPTER, MONTREAL, QUEBEC, CANADA: President, Robert McCullough, 5332 St. Denis St., Montreal, Quebec, Canada. Secretary, J. A. St. Laurent, 350 Victoria Avenue, Westmount, Quebec, Canada.

NASHVILLE CHAPTER, NASHVILLE, TENNESSEE: President, Robert L. Ray, 1010 B. Meridian Street, Nashville, Tennessee. Secretary, J. B. Thomas, 1602 West End Ave., Nashville, Tennessee.

NEW YORK CHAPTER, BROOKLYN, NEW YORK: Meets last Wednesday of each month. President, Emil J. Merenda, 4018 Church Ave., Brooklyn, New York. Secretary, Eugene N. Phillips, 164 Beach 86th Street, Rockaway Beach, New York.

NIAGARA FRONTIER CHAPTER, BUFFALO, NEW YORK: President, John K. Bush, 714 Elmwood Ave., Apt. No. 3, Buffalo, New York. Secretary, William Goeckel, 68 Brayton St., Buffalo, New York.

OIL CAPITAL CHAPTER, TULSA, OKLAHOMA: President, E. H. Churchwell, 23 E. Brady, Tulsa, Oklahoma. Secretary, Forrest E. Warehime, Box No. 1082, Sapulpa, Oklahoma.

ONTARIO FOREST CITY CHAPTER, LONDON, ONTARIO, CANADA: Meets 1st and 3rd Fridays. President, J. F. Yeddeau, 10 Hume St., London, Ontario, Canada. Secretary, S. Klimer, 5 Erie Ave., London, Ontario, Canada.

ONTARIO MAPLE LEAF CHAPTER, TORONTO, ONTARIO, CANADA: Meets 2nd and 4th Fridays. President, Kenneth Wood, 2001 Bloor St., W., Toronto, Ontario, Canada. Secretary, A. Smith, 117 Peter St., Toronto, Ont., Can.

PHILADELPHIA CHAPTER, PHILADELPHIA, PENNSYLVANIA: Meets 2nd Monday each month. President, F. H. Grant, 6706 Lynford St., Philadelphia, Pennsylvania. Secretary, R. E. Russel, 3828 Mary St., Drexel Hill, Pennsylvania.

(Continued on page 62)

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Chapter Directory
(Continued from page 60)

PITTSBURGH CHAPTER, PITTSBURGH, PENNSYLVANIA: Meets 2nd Friday each month. President, A. H. Ross, 702 Nevin Ave., Sewickley, Pennsylvania. Secretary, Paul Belec, 7139 Upland St., Carrick St., Pittsburgh, Pennsylvania.

PONY EXPRESS CHAPTER, ST. JOSEPH, MISSOURI: President, W. B. Nichols, 311 So. 7th Street, St. Joseph, Missouri. Secretary, E. J. Storm, 2815 Felix St., St. Joseph, Missouri.

ROCKFORD CHAPTER, ROCKFORD, ILLINOIS: Meets 1st and 3rd Mondays. President, Chas. G. Henley, 6520 N. 2nd St., Rockford, Illinois. Secretary, A. W. Overman, 1611 W. State St., Rockford, Illinois.

ST. LOUIS CHAPTER, ST. LOUIS, MISSOURI: Meets 2nd and 4th Thursdays. President, O. E. Petri, 3725 N. Taylor St., St. Louis, Missouri. Secretary, L. L. Vollman, 5342 Nagel Ave., St. Louis, Missouri.

SAN DIEGO CHAPTER, SAN DIEGO, CALIFORNIA: President, H. E. Friedrichs, 2716 Frankfort St., San Diego, California. Secretary, M. B. Hanks, 4072—38th St., San Diego, California.

SCRANTON CHAPTER, SCRANTON, PENNSYLVANIA: President, Karl Muller, 1514 Holly Road, Dunmore, Pennsylvania. Secretary, Chris G. Hess, 321 N. Everett Ave., Scranton, Pennsylvania.

SIOUX CITY CHAPTER, SIOUX CITY, IOWA: President, Frank Kutil, 1921 W. 4th St., Sioux City, Iowa. Secretary, H. R. Eriksen, 1303 W. 19th St., Sioux City, Iowa.

SPRINGFIELD CHAPTER, SPRINGFIELD, ILLINOIS: Meets 2nd and 4th Wednesdays. President, R. M. Potter, 102 E. Cook, Springfield, Illinois. Secretary, Edw. P. Greig, 223 E. Adams Street, Springfield, Illinois.

TOLEDO CHAPTER, TOLEDO, OHIO: Meets 2nd Wednesday. President, Paul Sizer, Waterville, Ohio. Secretary, Paul F. Roop, 2529 Marlboro, Toledo, Ohio.

TRENTON CHAPTER, TRENTON, NEW JERSEY: President, George Frie, 723 Puritan Avenue, Trenton, New Jersey. Secretary, Samuel Cohen, 215 E. Front St., Trenton, New Jersey.

TRI-COUNTY CHAPTER, ELGIN, AURORA and JOLIET: Meets 1st and 3rd Fri. President, Harold Anderson, 1207 Connecticut Ave., Joliet, Illinois. Secretary, Clarence C. Stumpf, 733 Dundee Ave., Elgin, Illinois.

TRI-STATE CHAPTER, HUNTINGTON, WEST VIRGINIA: Meets 2nd and 4th Tuesdays. President, Forrest Poole, 1246 Coles Blvd., Portsmouth, Ohio. Secretary, Carl Ackley, P. O. Box 685, Portsmouth, Ohio.

TWIN CITIES CHAPTER, MINNEAPOLIS, MINNESOTA: Meets 1st and 3rd Tuesdays. President, A. M. Palen, 3604—40th Ave., So., Minneapolis, Minnesota. Secretary, Dean Holmes, 1023 E. 28th St., Minneapolis, Minnesota.

VIRGINIA CHAPTER, RICHMOND, VIRGINIA: President, Ralph W. Lampie, 3719 Vawter, Richmond, Virginia. Secretary, B. A. Hauck, 4A-South Auburn Ave., Richmond, Virginia.

WESTERN MASSACHUSETTS CHAPTER, SPRINGFIELD, MASSACHUSETTS: Meets 2nd and 4th Wednesdays. President, Charles Adams, 572 Main St., Springfield, Massachusetts. Secretary, Harold Lambert, 31 Elm Street, Springfield, Massachusetts.

WICHITA CHAPTER, WICHITA, KANSAS: Meets 1st and 3rd Fridays. President, Frank H. Richards, 645 N. Lorraine Ave., Wichita, Kansas. Secretary, Howard N. Haselwood, 737 N. Main St., Wichita, Kansas.

WINNIPEG CHAPTER, WINNIPEG, MANITOBA, CANADA: President, J. B. Shepherd, 494 Clifton Street, Winnipeg, Manitoba, Canada. Secretary, R. F. Castling, 181 Burrin Ave., W. Kildonan, Winnipeg, Manitoba, Canada.

WOLVERINE CHAPTER, LANSING, MICHIGAN: Meets 2nd and 4th Tuesdays. President, O. S. McGuffy, 1812 N. Genessee Drive, Lansing, Michigan. Secretary, Vernon K. Jones, 1310 E. Mt. Hope Ave., Lansing, Michigan.

WORCESTER CHAPTER, WORCESTER, MASSACHUSETTS: Meets 1st and 3rd Tuesdays. President, T. H. Cronk, 15 Perkins St., Worcester, Massachusetts. Secretary, Stuart Garland, 32 Neptune Road, Worcester, Massachusetts.

WYOMING VALLEY CHAPTER, WILKES-BARRE, PENNSYLVANIA: President, F. M. Schultz, 161 Sambourne St., Wilkes-Barre, Pennsylvania. Secretary, E. E. Swank, 226 Lee Park Ave., Lee Park, Wilkes-Barre, Pennsylvania.

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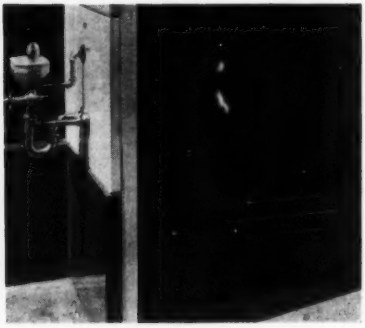

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INTRODUCING ERIC DAVIS

MR. AND MRS. RALPH DAVIS are the proud parents of a son, Eric, born April 30, 1941. His weight at birth was six pounds, five ounces.

Ralph is a member of the Niagara Frontier Chapter Board of Directors, and Treasurer of the State Association. He has always taken an active interest in Society activities. The Niagara Frontier Chapter joins their many friends in extending to Mr. and Mrs. Davis the heartiest of congratulations.

* * *

ADVERTISING CIRCULARS AVAILABLE FOR R.S.E.S. MEMBERS

DURING the past month R.S.E.S. members received samples of three circulars prepared by the Advertising Committee to be used in circularizing domestic and commercial customers.

These circulars are attractively illustrated and printed in colors with a strong sales story on the value of periodic inspections and suggestions for modernizing existing equipment for improved operating efficiency.

Two of the circulars, measuring 6x6¼ inches, are to be used as enclosures with letters, invoices and other mail matter.

The large circular, 8½x11 inches, is a self-mailing piece with a return card inviting a free inspection.

Each circular, in addition to the direct sales message to the customer, contains a brief outline of the Society and the value of membership to the member who mailed the circular.

The circulars are individual in that they carry the imprint of the member's name, his business location and phone.

These circulars represent the first direct mail material available for members and their design and finished appearance are comparable to material prepared by national advertisers.

8th Annual Convention of the Society to be held in Chicago

January 12-15, 1942

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A number of troubles can be detected by comparison of the existing head pressure and what the head pressure should be, but in the past there has been no convenient method available to the service engineer to determine what the correct head pressure should be. Such variable conditions as the suction pressure, room temperature, water inlet and outlet temperature, kind of gas used, etc., all determine the proper head pressure. It is not practical to depend on one's memory of other similar conditions or to just use snap judgment when this handy calculator gives you the correct answer so easily. Send for it today! Sturdily constructed, with oil-proof finish, for on-the-job use.

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WITH this outfit you know exactly how much refrigerant reserve is contained in the system and how much must be added or purged to bring the liquid to the proper level. Works satisfactorily on all condensing units having a liquid receiver and in all refrigerants except ammonia. It pays for itself. Easy to operate . . . full instructions accompany each outfit.

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R. S. E. S. Chapter Notes

Under this heading will appear news of the chapter meetings. For names of the officers and dates of regular meeting nights, please refer to the Chapter Directory.

VIRGINIA CHAPTER

April 8—The meeting was held in conjunction with the local chapter of the A.S.R.E., and it was called to order by Mr. Armstrong, President of the A.S.R.E., and then turned over to E. W. McGovern of the R. and H. Chemicals Department, E. I. DuPont de Nemours and Company, who gave an interesting talk on moisture in the refrigerating system. The talk was followed by a question and answer period which kept Mr. McGovern busy for sometime. A welcome guest of the evening was L. L. Lewis, National President of the A.S.R.E. Mr. Lewis presented an informal talk on subjects of general interest.

The entertainment was completed with the showing of a film entitled, "A New World Through Chemistry," provided by Mr. McGovern.

April 9—This was a special meeting called by the chapter for the purpose of discussing and studying the General Electric hermetically-sealed unit furnished by the National Society. Descriptive matter of the operation and construction of the unit was distributed to those present, and a general discussion took place on problems connected with the servicing of these units.

April 23—The entire meeting was devoted to business matters of the chapter, part of which included the formation of a constitution and by-laws, which were adopted at this time.

May 14—Business matters took up the greater part of the evening, during which several reports were given and announcements were made regarding future educational meetings. Nominations were received for members of the Board of Directors, and following the usual procedure of elections, the members elected to the Board were: E. D. Weeks, J. B. Broughton, and Solomon Linfield.

ROCKFORD CHAPTER

April 28—Most of the business for the evening was postponed until the next meeting, since the educational program planned would require considerable time and the chapter desired to devote as much time to it as possible. The meeting was turned over to R. S. Penn of the Penn Electric Switch Company, who proceeded with a very interesting demonstration of the products manufactured by his company. The demonstra-

tion required approximately two and a half hours and proved both educational and interesting to those present. During the short business session that followed, the president spoke of the possibilities of arranging the annual chapter picnic, and suggested that work should be started immediately on these arrangements. He also announced a dance to be held in Aurora to which the chapter had been invited.

At the close of the meeting, the Gustave A. Larson Company, wholesale refrigeration parts jobber, provided both the men and the ladies, who joined the meeting at this time, with a very nice luncheon.

May 5—The meeting was devoted almost entirely to business and to the discussion of the forthcoming picnic. O. H. LaBudde was appointed chairman of the picnic, with L. L. Sturch and C. C. Carlson as committee members.

May 19—No educational program was held during the evening, and the greater part of the time was devoted to discussions of the picnic. Additional members were appointed to the committee, and plans were nearly completed.

The sergeant-at-arms drew the name of Charles Billmyer for the attendance prize, but since Charles was not present, the amount was returned to the treasury.

INDIANAPOLIS CHAPTER

March 11—The meeting was called to order at the Hoosier Athletic Club, and on the educational program a True and False Quiz contest entertained both members and many visitors present. During the business session, a discussion was held on the possibilities of the National Convention's being held in the East at a future date.

March 25—After the meeting had been called to order, President Wulf introduced R. J. Thompson of Kinetic Chemicals Company, who gave a very interesting talk on F-12, comparing its characteristics with those of others of the Freon family, and providing some very useful information on the use of F-12. Mr. Thompson was kept occupied for sometime following his talk with questions asked from the floor.

April 28—The meeting was called to order by President E. W. Wulf. The educational program of the evening included: First, a discussion on contracts between manufacturing companies and servicemen; second, a discussion by a representative of Minneapolis-Honeywell Regulator Company on his company's controls; and third, a demonstration and talk by Linn Krauss on Detroit Lubricator Company controls.

TWIN CITIES CHAPTER

May 6—The meeting was called to order by President Art Palen, and as a part of the

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Visoleak Shows You Those "Hard-To-Find" Leaks In Freon Systems

• Visoleak has proven extremely useful in Freon systems due to the difficulty of leak detection by ordinary methods.

HOW TO USE VISOLEAK

Use 4 fluid ounces, plus 1 ounce for each 10 pounds of refrigerant. At the low prices listed below you can't afford to be without Visoleak, it saves you money in time, effort and refrigerant loss. Your jobber carries it, or write us direct.

PRICES

4 Ounce Can	$ 1.00
8 Ounce Can	1.75
1 Pint Can	3.00
1 Quart Can	5.00
1 Gallon Can	16.00

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business session of the evening, a motion was made and duly passed that the chapter purchase two cuts of each size of the Society emblem for the purpose of renting it to members of the chapter. It was decided that the deposit on the cut should amount to twice the original cost of the cut, and that the members should be limited to seven days free use, after which a 25c-per-day charge would be made, and that if the cut was kept for more than ten days, the deposit would be forfeited.

Announcement was made of a forthcoming Frigidaire service clinic, to be held in St. Paul, to which the chapter had been invited.

NIAGARA FRONTIER

The chapter observed Ladies' Night at Seneca Vocational High School in Buffalo. The highlight of the program was a skit put on by chapter members, entitled, "See the Glamour Girl." Motion pictures of the 1941 National Convention were shown. President John K. Bush presided.

ATLANTA CHAPTER

May 16—The meeting convened at 7:30 in the evening for a steak dinner before the business session. After a delicious dinner, the roll was called, minutes read, and the main business of the evening, the election of officers, got under way. The following officers were elected: Joe Stevens, *President;* Ned Jennison, *1st Vice-Pres.;* George Weldon, *2d Vice-Pres.;* J. W. Parker, *Secretary;* David Galloway, *Sergeant-at-Arms;* Charles Biggers, R. M. Graves, S. A. Mayfield, T. L. Carnell, and H. W. Madden, *Board of Directors.*

The election over, a discussion was introduced on the proposed city license to protect the legitimate service engineers. It was agreed that the present city license, being too low, permits illegitimate mechanics to do refrigeration service work in competition with recognized service establishments, and it was, therefore, decided that Messrs. Carnell and Gullatt should draw up a proposal for submission to the group at the next meeting. It was also decided to contact City Authorities to find out about the proper procedure for establishing a new license rate.

ONTARIO MAPLE LEAF CHAPTER

May 16—This, the last meeting of the season, was called to order by President Ken Wood, and a short business session was held prior to the entertainment.

It was agreed that the annual picnic and golf tournament should be held as usual, the picnic to be planned for June 22, and the golf tournament to be arranged for by the entertainment committee. One hundred dol-

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lars was voted to the Toronto Evening Telegram War Victims' Fund, and then Bert Nye gave a brief talk on his recent visit to the REMA, including the discussion of many interesting subjects.

When the meeting adjourned, everyone enjoyed the floor show, pretzels, and beverages, which had been provided for by the entertainment committee.

* * *

Ladies Auxiliary

KANSAS CITY AUXILIARY

April 22—The meeting was called to order by Mrs. Cox, President. Mrs. Meeker read correspondence received by the auxiliary, and a get-well card was signed by those present and sent to Mrs. H. F. Andrews.

The rest of the evening was spent playing cards, with prizes going to Mrs. Cox and Mrs. Meeker.

ROCKFORD AUXILIARY

April 28—The election of officers was held with Mrs. Freda Sturch elected President, Mrs. LaBoodle, Vice-President, Mrs. Overman, Secretary, and Mrs. McCarthy, Treasurer. After other miscellaneous business matters had been taken care of, the rest of the evening was spent in playing "Donkey," with Mesdames LaBoodle, Sturch, and Larson winning the prizes. The ladies then joined the men for refreshments supplied by the Gustave A. Larson Company.

May 5—The Secretary's and the Treasurer's annual reports were submitted at this time, and the newly-elected officers were installed in their offices. The entertainment for the evening consisted of the game, "Cootie," with Mesdames Sturch, Overman, and McCarthy being the winners.

May 19—The first part of the evening was devoted to miscellaneous business matters of the auxiliary, after which the evening was spent in playing "Rummy," with Mesdames Overman, Kruse, and Sturch winning the prizes.

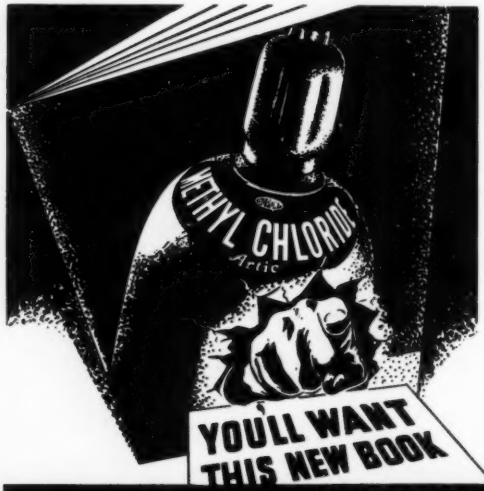
TRI-STATE AUXILIARY

May 13—The entertainment committee had arranged for the evening a surprise stork shower, held in honor of Mrs. Cottle. She received some very dainty gifts.

Contests held after the shower proved profitable to Mrs. Cottle and Mrs. Young, who received the prizes. Mrs. Cottle served refreshments after the meeting.

ILLINOIS VALLEY AUXILIARY

May 6—The meeting was opened with the Pledge of Allegiance, and after the business



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was disposed of, two tables of Pinochle and one table of Bridge were organized. Mrs. Tobias, Mrs. Wolcott, and Mrs. Ruyle won the prizes.

After the meeting, the ladies joined the men in partaking of a buffet luncheon served by the Penn Electric Switch Company.

May 23—After a short business session, Pinochle was played, and the winners were Mesdames Dresback, Luckert, and Harris. The ladies joined the men in the coffee shop for refreshments after the meeting.

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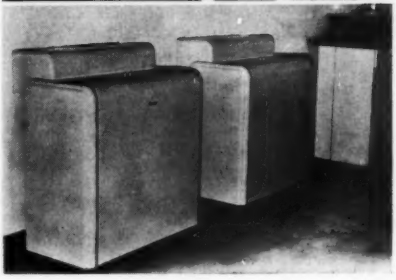
AIR CONDITIONING SPEEDS TOOL MAKING

PRECISION grinding spindles turning at the rate of 50,000 revolutions per minute are being manufactured at the Landis Tool Company, of Waynesboro, Pa., with the help of air conditioning, according to Edward T. Murphy, vice president in charge of marketing, Carrier Corporation, Syracuse, N. Y.

"Operating at speeds of 50,000 revolutions per minute, these spindles must be absolutely true, perfectly balanced and free from any vibration," Mr. Murphy said. "It was discovered in the laboratory that metal parts for these high speed spindles—due to expansion and contraction caused by atmos-



A corner of the Landis Tool Company (top) and the two air conditioning units (bottom) which provide the necessary cooling.

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The Landis Tool Company specializes in manufacturing high production grinding machines for turning out a myriad of precision parts for the automotive, airplane, ball bearing, electrical, farm machinery and steel industries and for metal working plants in general. The spindles assembled in this air conditioned laboratory carry the grinding wheel on a specialized type of machine used by the ball bearing industry.

ANSUL PERSONNEL CHANGES

LEONARD K. WRIGHT, who for the past year, has traveled for the Ansul Chemical Company out of the Indianapolis office, under District Manager, George B. Vermilye, has been promoted to District Sales Manager, with headquarters at Des Moines, Iowa, covering Minnesota, Iowa, North Dakota, South Dakota, Nebraska, Kansas, and Missouri.

Mr. Wright assumes the position held by Lester T. Plouff, who has been promoted to Assistant National Sales Manager of the Dugas Engineering Corporation, 59 E. Van Buren St., Chicago, a subsidiary company of the Ansul Chemical Company.

Leonard Wright is a graduate of the University of Tennessee, and a nephew of Mrs. M. W. Leinert, owner of the Leinert Engineering Company, Knoxville, Tenn., a prominent refrigeration parts jobber in that area. He is single, but his status is expected to be changed on June 21, when he will marry a prominent Memphis, Tennessee debutante, the daughter of an army officer.

L. T. (Tom) Plouff is a local Marinette product, a graduate of Notre Dame University, having attended that school during the regime of the Four Horsemen. He is married and has two boys. Prior to joining the Ansul organization two years ago, he was connected with the First National Bank of Chicago.

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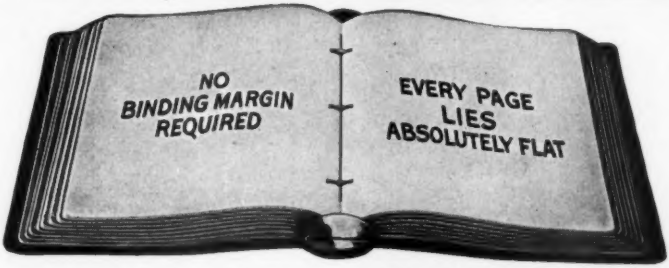

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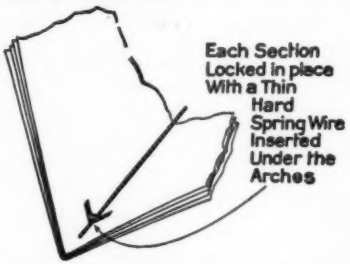

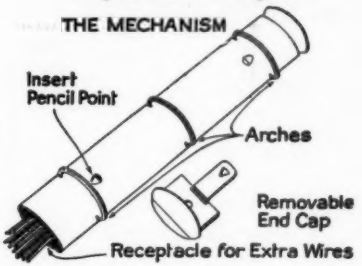

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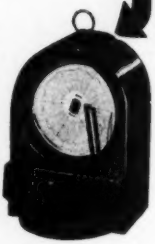

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DAYTON RUBBER OPENS NEW BRANCH

THE Dayton Rubber Manufacturing Company have recently leased the property at 1011-19 West Washington Boulevard, Chicago, for sales, engineering and warehousing purposes.

This additional space is required because of a greatly increased demand for Dayton V-Belts in the Chicago area. The company with headquarters in Dayton, Ohio, are nationally known manufacturers of industrial V-belts, fan belts, synthetic printing rollers, specialized railroad equipment and tires and at this new location, will expand their warehousing facilities for better service to the industrial trade in the Chicago area.

BOOK REVIEWS

MODERN AIR CONDITIONING, HEATING AND VENTILATING. By Willis H. Carrier, Rialto E. Cherne, and Walter A. Grant. Published by Pitman Publishing Corp., New York and Chicago. Illustrated. 548 pages. Price $4.50. For sale by Nickerson & Collins Co., Chicago, Ill.

In this practical new handbook, the facts and formulae on every type of application problem in air conditioning, heating and ventilating are treated. It provides engineers, technical workers, and all concerned with the three closely interrelated fields, much new information. The authors, each of whom is an executive of the Carrier Corp., show step by step how to design, how to apply and how to use air conditioning, heating and ventilating to meet the needs of today. Illustrating the book are over 450 photographs, diagrams, charts and tables. This one volume contains the best engineering information available on the subject, and is a book of prime interest to anyone connected with the industry. Not only instructors and students, but also practical workers will welcome the thorough organization and application of theory to all practical problems which have resulted in a compilation of valuable engineering information on the subject covered.

THE FROZEN FOOD INDUSTRY. By Harry Carlton. Published by The University of Tennessee Press, Knoxville, Tenn. 196 pages 6 x 9. Charts, maps, tables and curves. Price $2.00. For sale by Nickerson & Collins Co., Chicago, Ill.

Here is the first complete story of this

new and rapidly expanding industry, which covers all phases of frozen food production and distribution from the grower to the consumer.

Written by an impartial authority, this book is based on six years' investigation of the frozen food industry. Two long field surveys were made, one of six months covering the large consumer markets east of the Mississippi, including Eastern Canada; and another of ten months covering the principal agricultural production areas, food processing plants, and consumer markets in the United States and Western Canada. These surveys not only covered frozen food production, but competing and related industries which may effect the development of the new industry. Research laboratories and agricultural experiment stations were visited.

The book is a concise, clearly written assembly of pertinent facts, from these field surveys and the author's voluminous studies of the frozen food industry.

* * *

NEW CATALOGS AND BULLETINS

COPELAND REFRIGERATION CORP., Sidney, Ohio, have available a beautiful 35-page full-color catalog containing complete description and specifications on highsides and compressors of all sizes. The appearance and arrangement of the book is such that it is useful both as a selection guide and a sales aid.

In addition to the highsides listed, there are two pages devoted to water coolers and refrigerator cabinets.

TECUMSEH PRODUCTS CO., Tecumseh, Mich., makers of refrigeration compressors and highsides, have issued a 32-page catalog of

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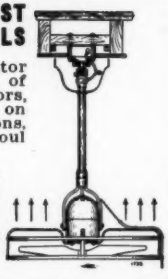

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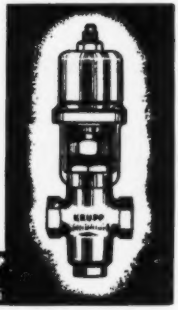

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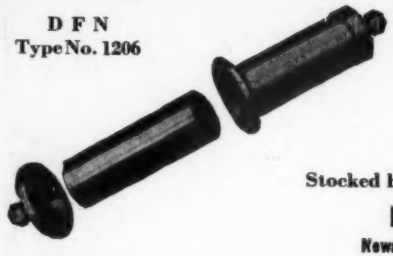

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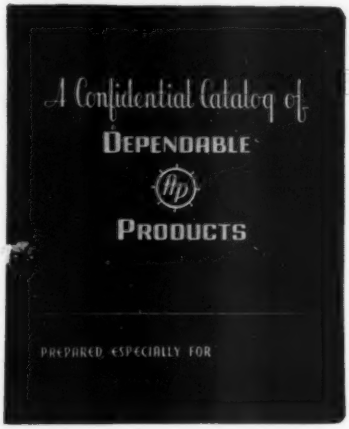

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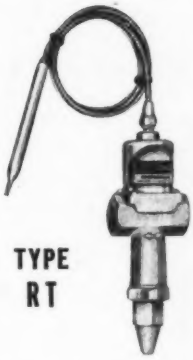

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ESRJ	⅝"	SHORT TYPE	.09	.07¾	.07½

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"BIGGER THAN EVER"

UNDER the above title a most attractive direct mailing piece has been distributed to practically every refrigeration contractor and service engineer in the United States by Ranco, Incorporated, Columbus, Ohio. Presented in colorful design, the circular is primarily intended to provide full descriptions of Ranco's Type 91G2, Type O, and Type G2 controls. Inserted in the large circular which may be detached for filing away for convenient reference is a complete listing of exact Ranco household control replacements.

The circular has a timely appeal and ties up with the title of the circular by pointing out that today more people are working and, consequently, from now on a "bigger than ever" demand for commercial controls will be made.

Quoting from the circular, "Money is on the move—in grocery markets, delicatessen stores, drug stores, hotels and restaurants; food merchant stocks are larger—with more perishables to be protected against shrinkage and spoilage. It is an outstanding opportunity for everybody associated with the commercial refrigeration industry."